DOCUMENT RESUME

ED 381 397 SE 056 263

TITLE	Safety in Science for Primary Schools. 1st Edition.
INSTITUTION	Association for Science Education, Cambridge (England).
REPORT NO	ISBN-0-86357-209-X
PUB DATE	94
NOTE	81p.
AVAILABLE FROM	Association for Science Education, College Lane, Hatfield, Herts AL10 9AA England, United Kingdom.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Demonstrations (Science); Elementary Education; Elementary School Teachers; Foreign Countries; Instructional Materials; *Safety; *Safety Education; Science Education; *Teacher Education
IDENTIFIERS	*Be Safe; England

ABSTRACT

This packet of teacher education materials is based on the publication "Be Safe!" and is intended for those teaching science to children ages 4 to 12. The pack contains INSET materials that supplement a safety exhibition contained in the second edition of "Be Safe!." Five basic activities include instructions for training leaders and reproducible teacher education materials. Activities cover: (1) how to use the exhibition material (contains copy masters for a question sheet, drawings, and answer sheet); (2) brainstorming on safety; (3) safety quiz, and how to use quiz materials (contains copy masters for quiz cards and safety quiz answers); (4) developing a school policy for safety in science and a science safety checklist; and (5) teaching children about safety and suggestions for activities for children. Appendices provide letters from government officials (England) endorsing the program, safety bibliography (14 references), immediate remedial measures in the event of an accident, example of the safety section from one school's science policy, safety background materials, index, and common safety symbols. (LZ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 381 397

The Association for Science Education

Safety in Science for Primary Schools

An INSET pack for use by:

Science Co-ordinators
Headteachers
Advisory Teachers
Advisors

Teacher Trainers

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
JANE R. HANROTT
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it
☐ Minor changes have been made to improve reproduction quality
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

1st Edition

© ASE 1994

BEST COPY AVAILABLE

#SE053263

© The Association for Science Education, 1st edition 1994, 0 86357 209 X

The Association for Science Education, College Lane, Hatfield, Herts AL10 9AA
Tel: 0707 267411 Fax: 0707 266532

Safety in Science for Primary Schools

The pack can be used in a variety of ways ...

For example:

- In staff meetings to raise awareness of aspects of safety in science with colleagues
- To develop a school safety policy for science
- INSET run by advisors or advisory teachers
- Local ASE meetings
- Part of the professional development of teachers during initial teacher training, or subsequent in-service courses

The pack is based on the publication *Be Safe!* and is aimed at those teaching children aged from about 4 to 11 or 12, depending upon the type of organisation. It should be equally applicable in England, Scotland, Northern Ireland or Wales and in all types of school: infant, junior, middle or preparatory schools, whether state schools (including grant maintained) or independent.

This INSET material and the booklet *Be Safe!* is thought essential for all those engaged in teaching science to young children. It also covers overlapping aspects of technology.

ASE Safety in Science for Primary Schools

This INSET pack for use by primary teachers was prepared by members of the ASE Safeguards in Science Committee, together with members of the writing team for *Be Safe!* and the Primary Science Committee.

Members of the INSET pack writing team:

John Wray	Chair and editor, Educational Consultant
Peter Borrows	Waltham Forest Evaluation and Advisory Service
Barbara Wyvill	Educational Consultant
Liz Lawrence	Science and IT Co-ordinator, Clockhouse Junior School, Havering
Barry Marriott	Technology Advisory Teacher, Havering
John Lawrence	Deputy General Secretary, ASE

Drawings by: Deanna Melchior, ASE Illustrator
Typeset by: Commercial Campaigns

Members of the writing team for the second edition of *Be Safe!* (1990):

Peter Borrows*	Waltham Forest Evaluation and Advisory Service (Chair)
Phil Bunyon*	Science Inspector, Nottinghamshire
John Carleton*	Second Master, Haberdashers' Aske's School, Elstree
Joe Jeffries*	Head of Physics, King Edward VI School, Retford, Nottinghamshire
Liz Lawrence	Science and IT Co-ordinator, Clockhouse Junior School, Havering
John Lawrence	Assistant Secretary, ASE
Vicki Lewis	Primary Science Advisory Teacher, Mid-Glamorgan
Dick Orton*	Deputy Director, CLEAPSS School Science Service, Uxbridge
Susan Plant	Technology Workshop Manager, Bedfordshire
Mike Prince	Advisory Teacher for Science and Technology, Northamptonshire
Nick Stanley	Advisory Teacher for Science and Technology, Essex
Ray Vincent*	Head of Science, Ilford County High School, Redbridge
John Wray*	Science Education Consultant, formerly ILEA Inspectorate
Barbara Wyvill	Science Education Consultant, formerly North London Science Centre

** Member of ASE Laboratory Safeguards Sub-committee (now Safeguards in Science Committee)*

Acknowledgements

We would like to thank Rosemary Feasey and Roy Mallaby for suggestions on how the safety exhibition developed from the *Be Safe!* booklet could be adapted and used as a stand alone INSET pack for teachers and others. In addition, we thank Chris Pocock (of the CLEAPSS School Science Service), John Richardson (of SSERC), Anne Goldsworthy (of the Primary Science Committee), John Stringer (of the SATIS 8-14 Project) and various members of the Association who took part in trials of the materials at the Annual Meeting in Birmingham in 1994 for their helpful comments on the first or subsequent drafts.

We would welcome any comments you may have on this INSET pack and any suggestions for improvements or additions, so that any future edition can better meet the needs of teachers. Please send your comments to ASE HQ, marking your envelope ***Be Safe!* INSET.**

Photocopying

The copyright of this INSET pack belongs to the Association for Science Education. However, photocopies of the white pages only may be made in the purchasing school or institution for use with colleagues or teachers in training. The coloured pages are for guidance or commentary only.

© The Association for Science Education, 1st edition 1994, 0 86357 209 X

The Association for Science Education, College Lane, Hatfield, Herts AL10 9AA
Tel: 0707 267411 Fax: 0707 266532

CONTENTS

Introduction		
	Background	7
	How to use the INSET Pack	8
Activity 1:	**So how much do you know about Safety?**	9
	How to use the Exhibition material	10
	Exhibition Question Sheet (copymaster)	11
	Exhibition Drawings (copymaster)	13
	Exhibition Answer Sheet (copymaster)	27
Activity 2:	**Why Safety?**	35
	Brainstorm on safety	37
Activity 3:	**Safety Quiz**	39
	How to use the Quiz materials	40
	Quiz Cards (copymaster)	41
	Safety Quiz Answers (copymaster)	44
Activity 4:	**Making it relevant for your school**	51
	Developing a policy for safety in science	52
	A science safety checklist	54
Activity 5:	**Teaching children about Safety**	55
	A safe education is not the same as safety education	56
	Activities for children	57
Appendices		
	Appendix 1 Letters from Secretary of State endorsing *Be Safe!*	58
	Appendix 2 Safety Bibliography	60
	Appendix 3 Immediate Remedial Measures in the Event of an Accident	61
	Appendix 4 Example of the Safety Section from one school's Science Policy	62
	Appendix 5 *Safety and the School Pond*, P. Bunyan, reprinted from *Primary Science Review*, 1988,21	63
	Appendix 6 *Safety in out-of-school science*, R Vincent and J Wray, *reprinted from School Science Review*, 1988, 250, 70, 55	65
	Appendix 7 *Safety*, reprinted from the ASE publication Science *Teachers' Handbook, Primary Handbook*	70
	Appendix 8 Index to *Be Safe!* (2nd edition)	72
	Appendix 9 Common Safety Symbols	77
Back cover	Details of benefits of ASE membership, including insurance	

INTRODUCTION

BACKGROUND

The first edition of *Be Safe!* was published by the Association in 1988 and was soon followed by a second edition in 1990. This second edition was prepared in consultation with the Health and Safety Executive's Education Service National Interest Group and with Her Majesty's Inspectorate of Schools and the then Department of Education and Science.

The second edition was highly praised. A letter to all Chief Education Officers in England and Wales by the Secretaries of State commended the publication of *Be Safe!* (Appendix 1). It has been adopted by many LEAs as forming the basis for general risk assessments (see below) and is seen by many as the essential document on safety in primary schools. Indeed, many schools have given a copy of *Be Safe!* to every teacher in the school. It can be used by the independent sector and by middle schools.

The Association has now sold over 52 000 copies of editions 1 & 2 of *Be Safe!* (March 1994).

Following the publication of the second edition, an exhibition on safety, based on the booklet *Be Safe!* was prepared by the Safeguards in Science Committee. This has been used at several ASE Annual Meetings, Area Meetings, Region and Section meetings. Staff from the CLEAPSS School Science Service have also used the exhibition on their INSET.

While the exhibition is an excellent way to explore with colleagues the issues raised by teaching science to children in the aged 5-11, it does take a considerable time to resource and set up. At the suggestion of a number of teacher trainers, the Association has produced this INSET pack in an attempt to provide Science Co-ordinators, Headteachers, Advisors and Advisory Teachers with a resource that does not depend on the full exhibition. The opportunity has also been taken to add some further INSET activities to make the materials more versatile.

HOW TO USE THE INSET PACK

There are five basic Activities in this pack, with some alternative approaches within them.

The general outline of the INSET sessions will depend on the time available. To do justice to all the Activities would probably take well over three hours.

If used for school-based INSET, Activities 1 and 2 would make a good introduction; Activity 3 could follow a week later; Activity 4 might be carried out by a working party. Activity 5 is rather different, and could serve as a stand-alone item.

A reasonable INSET session or ASE meeting lasting 2 hours might briefly dwell on Activity 1, then go on to Activities 2 and 3. However, the timing can be varied according to the desired emphasis.

The section on teaching children about safety, Activity 5, could be tackled as an assignment in a teacher training institution.

Sheets that are printed on white paper may be copied and distributed to each person. The sheets printed on coloured paper are intended as background or instructions for the presenter only.

The Appendices are on white paper, and can be copied if desired. For example, the sheet of Immediate Remedial Measures (Appendix 3) and the sheet of Common Safety Symbols (Appendix 9) might be copied for each classroom.

ACTIVITY 1

SO HOW MUCH DO YOU KNOW ABOUT SAFETY?

An exhibition of common situations for analysis and discussion

HOW TO USE THE EXHIBITION MATERIAL

If teachers are likely to be arriving slowly, at different times, this is a good Activity with which to begin. Early arrivals can get on with it, and discuss some issues in depth, whilst others are still arriving. Otherwise, it follows after Activity 2.

What you need: Each teacher needs the Exhibition Question Sheet, on which they can note down their responses.

In addition you need at least one copy of each of the Exhibition Drawings: for larger groups you may need more than one copy. In this pack, they are printed two to a page, and should be copied and cut up in advance. If you are likely to run the course several times, it would be worth mounting the drawings on card, and laminating them.

Depending on how you run the session, each teacher may also need the Exhibition Answer Sheet.

Procedure: Have the Exhibition Drawings arranged around the room.

If running this Activity as the opener, as teachers slowly arrive, they can go around as individuals, from drawing to drawing, noting answers to the questions. After 20 minutes or so (possibly longer), get them together in groups of about 3 to share and discuss their answers. After about 15 minutes of this, give out the official Exhibition Answer Sheet, and let them discuss further. Give them the opportunity to raise any particular points with the whole group.

If running this Activity second, straight after Activity 2 used as an introduction, you may find teachers reluctant to get up, and walk around. In that case, it may be preferable to have participants sitting in twos and threes. Pass the Exhibition Drawings amongst them, from group to group. Groups discuss each in turn (in no particular order). After about 30 - 40 minutes, give out the official Exhibition Answer Sheet, and let them discuss further. Give them the opportunity to raise any particular points with the whole group.

The purpose of this is to act as an ice breaker and get colleagues to discuss the issues raised by the questions. There is not necessarily a right or wrong answer. The need for an in depth study of *Be Safe!* and the development of a safety policy for the school may be only two of the more obvious outcomes from the Activity.

EXHIBITION QUESTION SHEET

NAME_____ **DATE**_____

Using the Exhibition Drawings, note down the salient points concerning the safety issues raised in each of the 'situations' presented to you.

You may include answers to:

What is the danger?
What would I do about it?
What should the school be doing about such incidents?

1. What action would you take if a child had burnt or scalded a hand?

2. Would you allow children to use a hot glue gun? What about other glues?

3. How can you fly a hot air balloon safely? (What heat sources are suitable? Where should you fly it?)

4. Which container would you use for holding hot water?

5. Which heat sources are the safest to use and which should not be used at all?

6. What sort of soldering iron should you use? Should children use them at all?

7. What would you do if a child cut him/herself badly?

8. What issues are there when cutting up tin cans to make models?

9. Which mirror should you use?

10. Testing thin wires. What are the safety issues raised in this picture?

11. Litter collections are popular, both in and out of school. Would you allow your children to take part?

12. Testing shopping bags. What are the issues raised in this picture?

13. Electricity is dangerous isn't it? But which of these are safe to use?

14. When and how should children be taught about electrical safety?

15. A parent brings an old electric fire for additional heat into the school. What should you do?

16. On a school day out it's fun in the sun. But is it?

17. This advert recently appeared in a national newspaper. The blue powder is copper sulphate. Should you use it in a primary school?

18. Surely food is safe isn't it, even if it is a bit mouldy?

19. Would you use a polystyrene hot wire cutter?

20. Which sort of thermometer would you use?

21. Cooking often arises in science activities: what hygiene requirements should you observe?

22. Ourselves is a common topic in primary schools. What problems might arise with the example given? (The pupil on the right is taking his pulse)

23. A popular book suggests the taking of a small blood sample and observing the resultant slide under a microscope. Is this a good idea?

24. Does your school have a pond or access to one? Is it safe?

25. All of these illustrations present a particular hazard. What is it?

26. Every classroom should have some living things, but which animals are suitable? What are the problems?

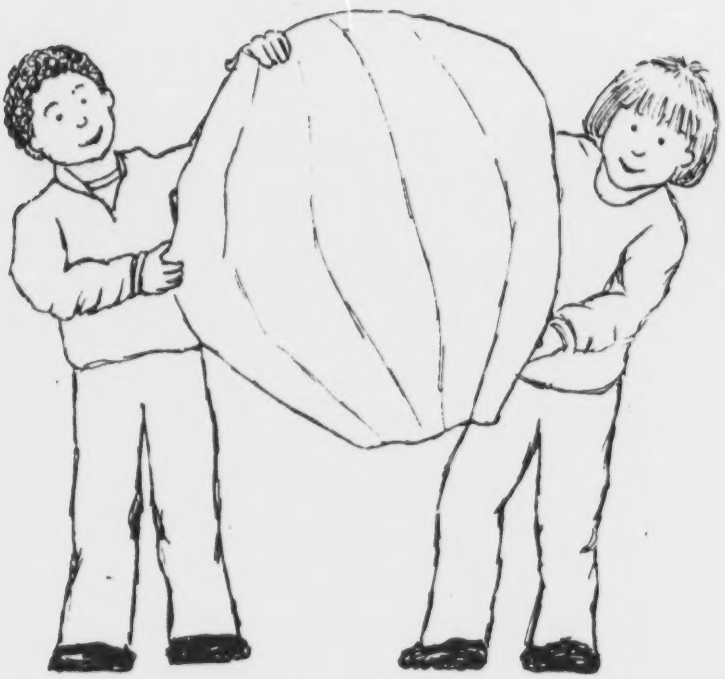
What other issues does the exhibition raise? Note down your comments and check that any concerns have been addressed by the end of the session.

EXHIBITION DRAWINGS

1. What action would you take if a child had burnt or scalded a hand?

2. Would you allow children to use a hot glue gun?

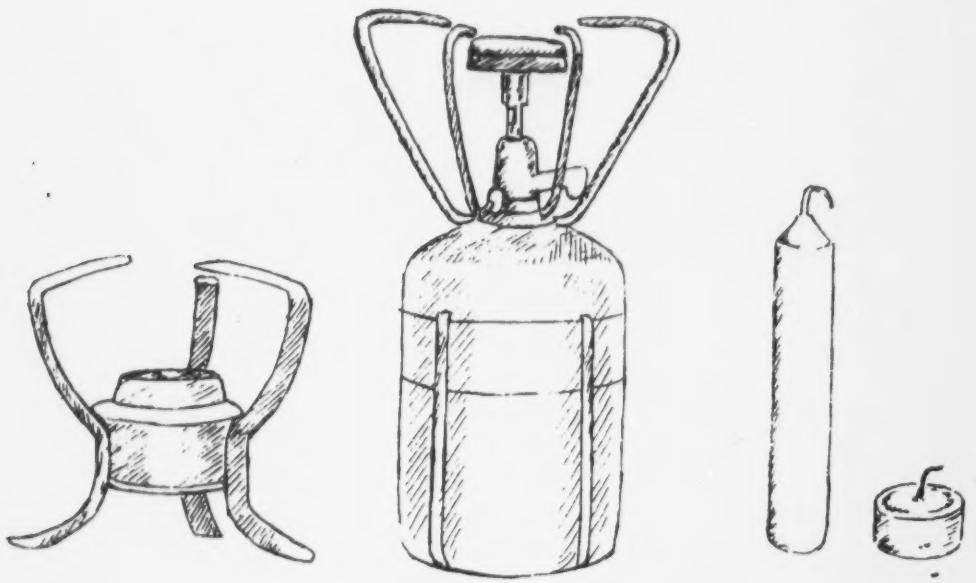
EXHIBITION DRAWINGS



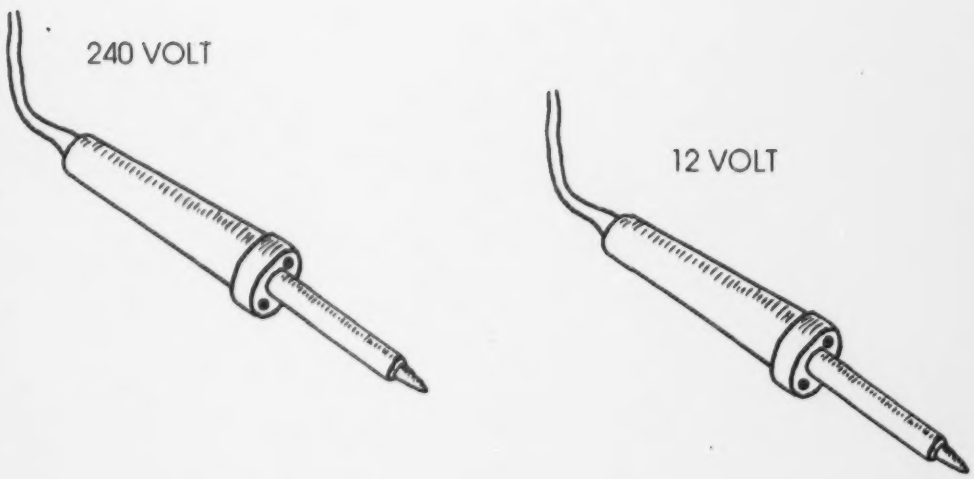
3. How can you fly a hot air balloon safely?

4. Which container would you use for holding hot water?

EXHIBITION DRAWINGS



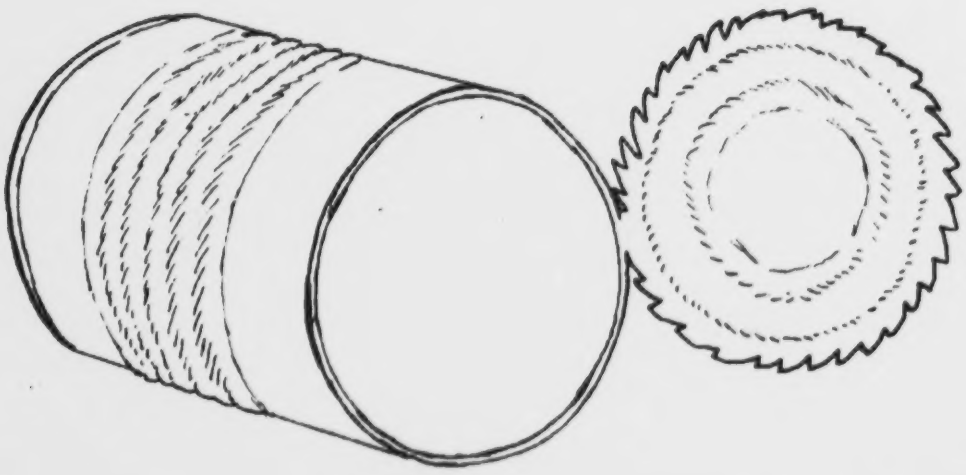
5. Which heat sources are the safest to use and which should not be used at all?



6. What sort of soldering iron should you use?

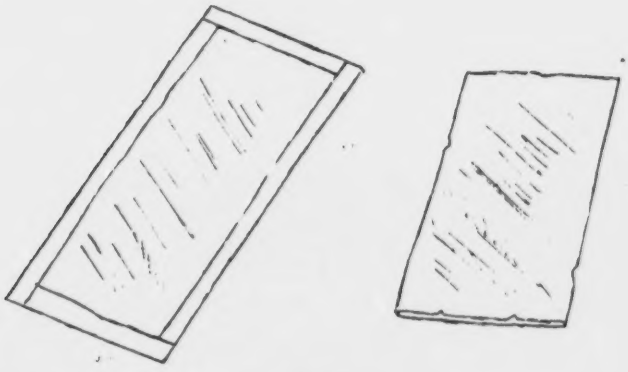
EXHIBITION DRAWINGS

7. What would you do if a child cut him/herself badly?

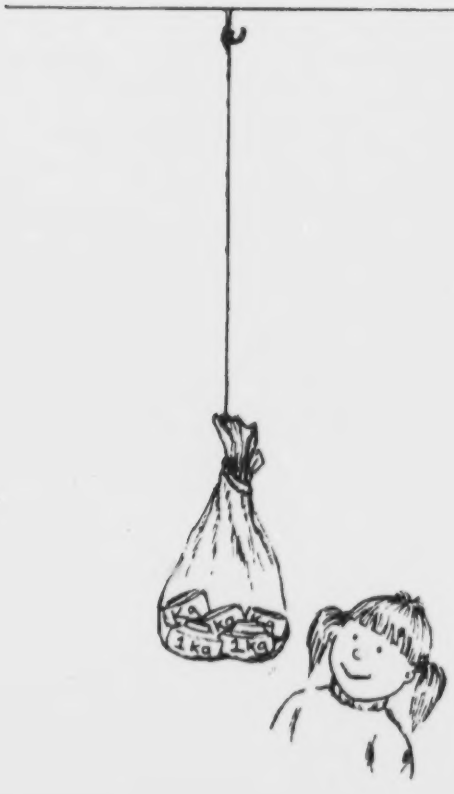


8. What issues are there when cutting up tin cans to make models?

EXHIBITION DRAWINGS



9. Which mirror should you use?



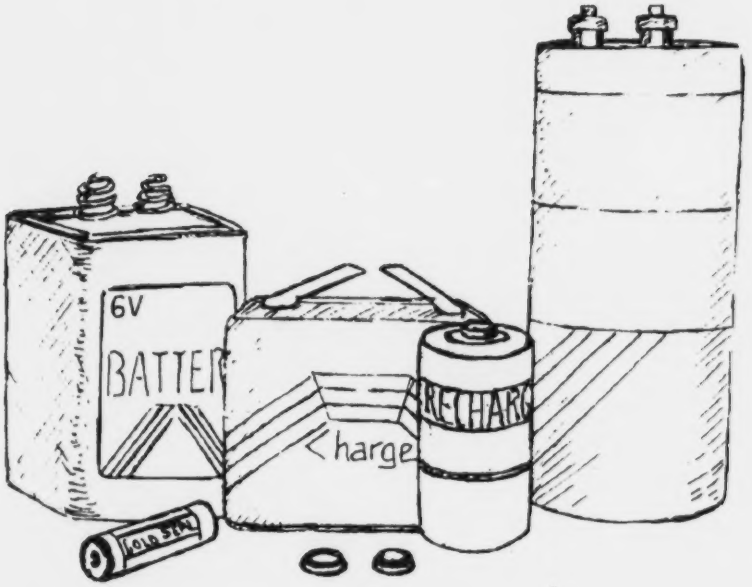
10. Testing thin wires. What are the safety issues raised in this picture?

EXHIBITION DRAWINGS

11. Litter collections are popular, both in and out of school. Would you allow your children to take part?

12. Testing shopping bags. What are the issues raised in this picture?

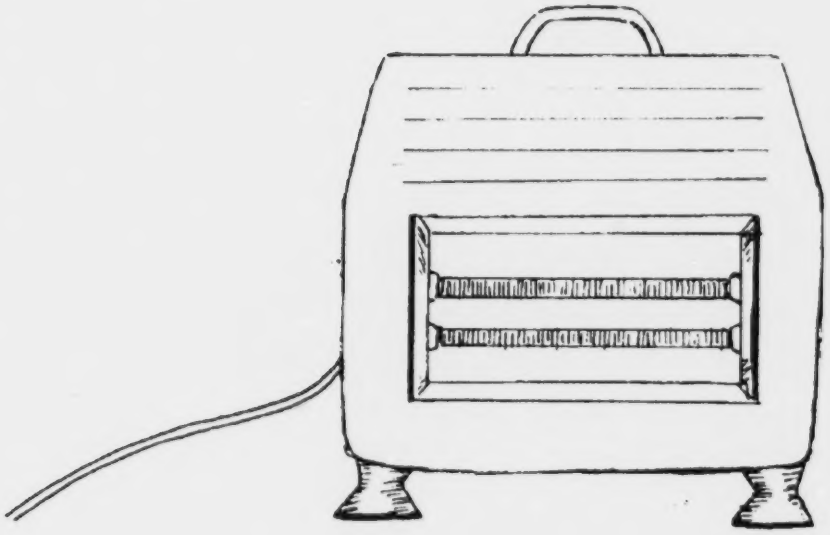
EXHIBITION DRAWINGS



13. Electricity is dangerous isn't it? But which of these are safe to use?

14. When and how should children be taught about electrical safety?

EXHIBITION DRAWINGS



15. A parent brings an old electric fire for additional heat into the school. What should you do?

16. On a school day out it's fun in the sun. But is it?

EXHIBITION DRAWINGS

17. This advert recently appeared in a national newspaper. The blue powder is copper sulphate. Should you use it in a primary school?

WARNING

SALTER SCIENCE
FUN WITH CRYSTALS

RISK OF POISONING
KEEP THIS PRODUCT OUT OF REACH OF CHILDREN

ACCIDENTAL CONSUMPTION of chemicals, namely Copper Sulphate - a "blue powder" contained in some batches of FUN WITH CRYSTALS could cause SEVERE POISONING.

If your FUN WITH CRYSTALS set is the same as the illustration above, and although it may not contain the "blue powder", please return it IMMEDIATELY to:

Peter Pan Playthings Limited,
Salter Science Department
Bretton Way
Bretton
PETERBOROUGH PE3 8YA

We will arrange a refund to be sent to you together with the cost of postage. PLEASE ENCLOSE NAME AND ADDRESS.

If you have already "made up" the product, using the "blue powder" we strongly urge you FOR YOUR OWN SAFETY to DISPOSE OF THE LIQUID and any REMAINING CRYSTALS. If you require advice concerning the safe disposal of any remaining chemical, in solution or in powdered form, please telephone the number given below.

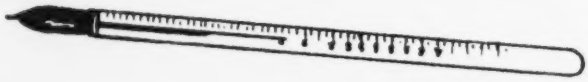
If you require any further information or guidance, please telephone our direct information line on (0733) 262542 between 9.00 am and 5.30 pm.

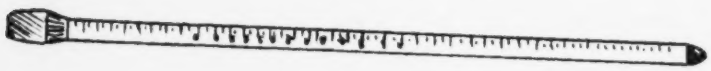
18. Surely food is safe isn't it, even if it is a bit mouldy?

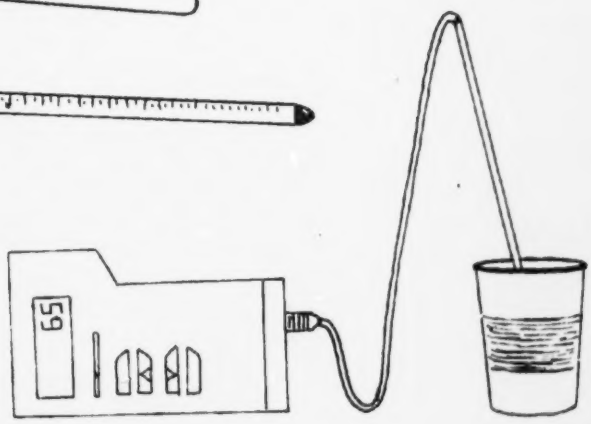
BEST COPY AVAILABLE

EXHIBITION DRAWINGS

19. Would you use a polystyrene hot wire cutter?

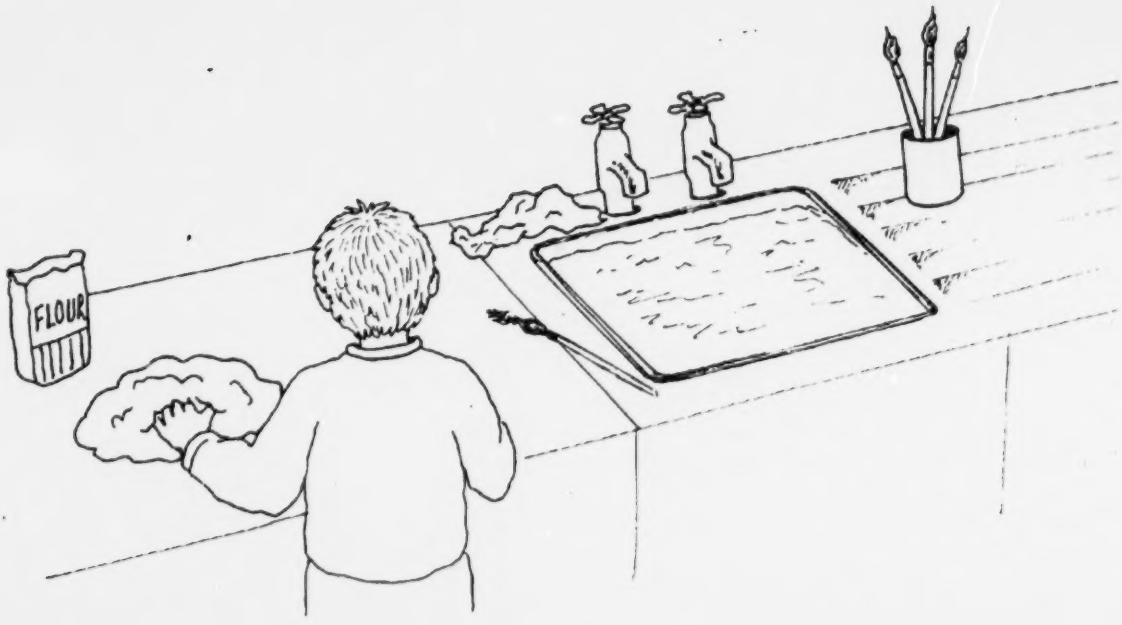




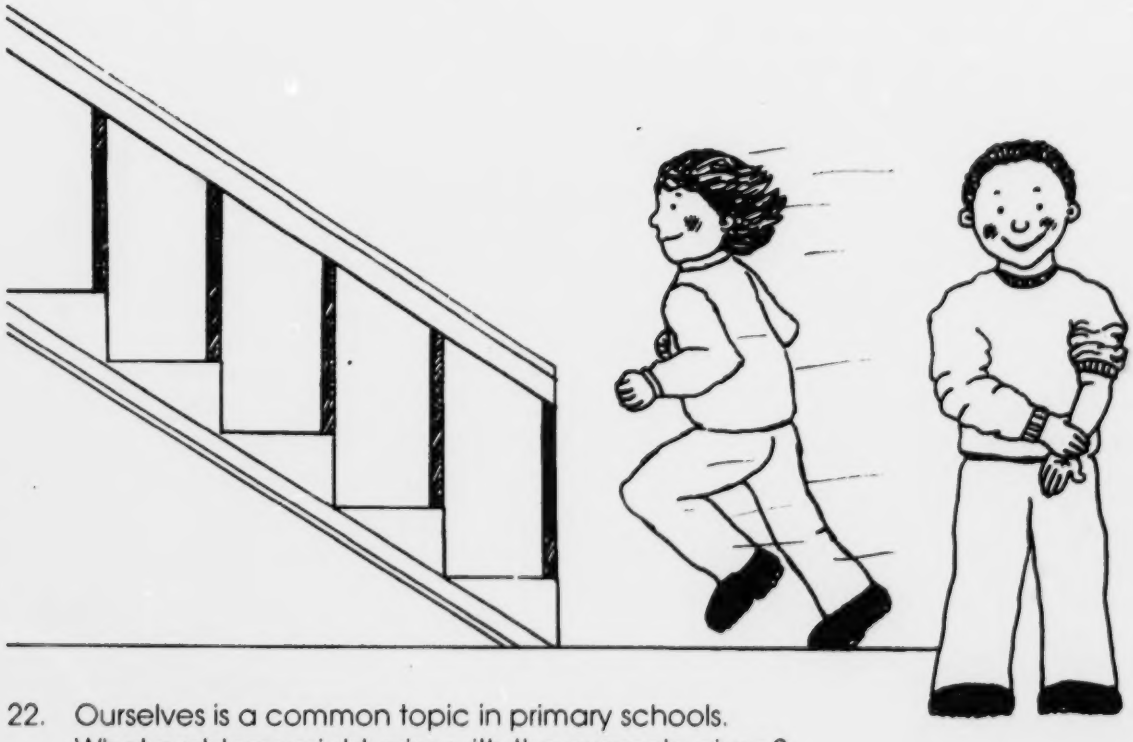


20. Which sort of thermometer would you use?

EXHIBITION DRAWINGS

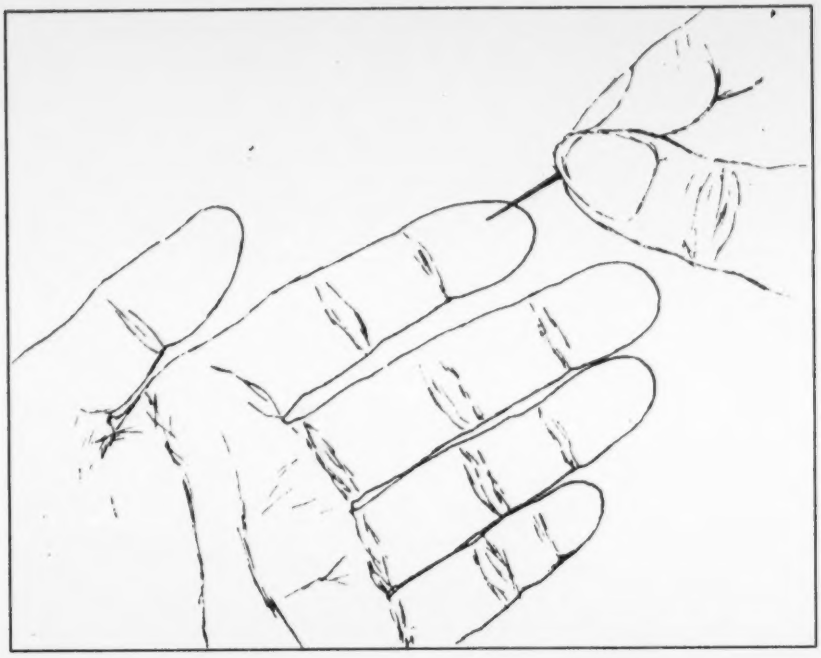


21. Cooking often arises in science activities: what hygiene requirements should you observe?



22. Ourselves is a common topic in primary schools. What problems might arise with the example given?

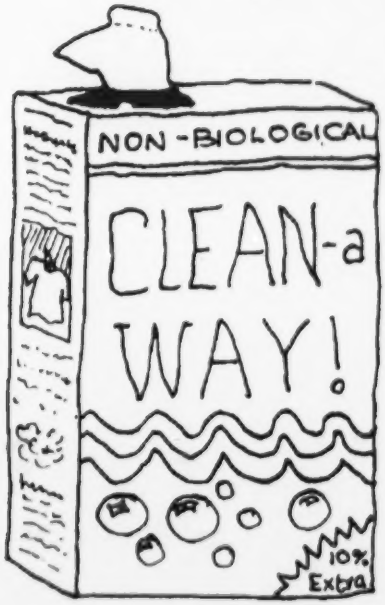
EXHIBITION DRAWINGS

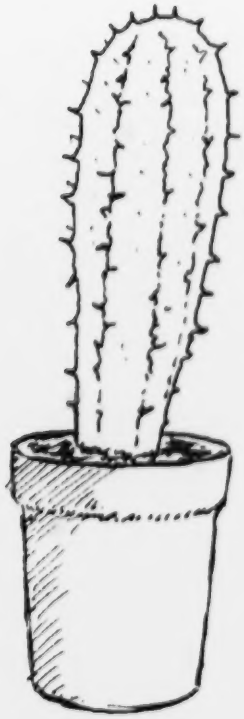


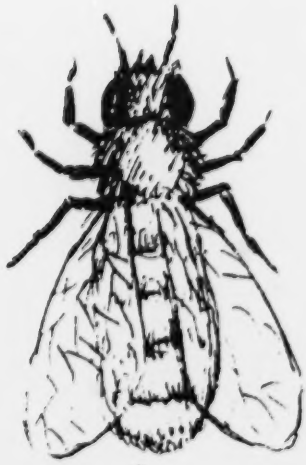
23. A popular book suggests the taking of a small blood sample and observing the resultant slide under a microscope. Is this a good idea?

24. Does your school have a pond or access to one? Is it safe?

EXHIBITION DRAWINGS

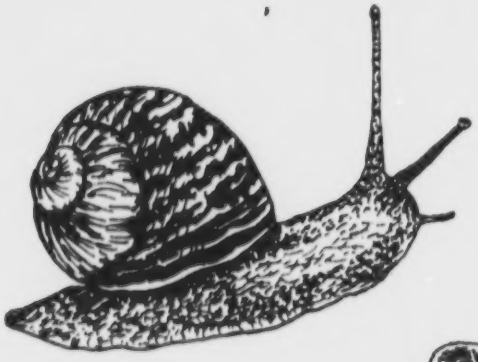


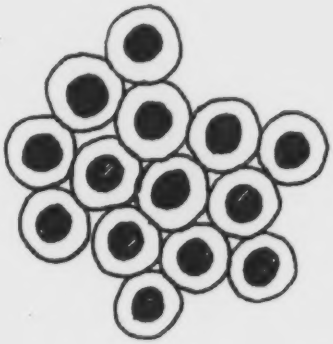


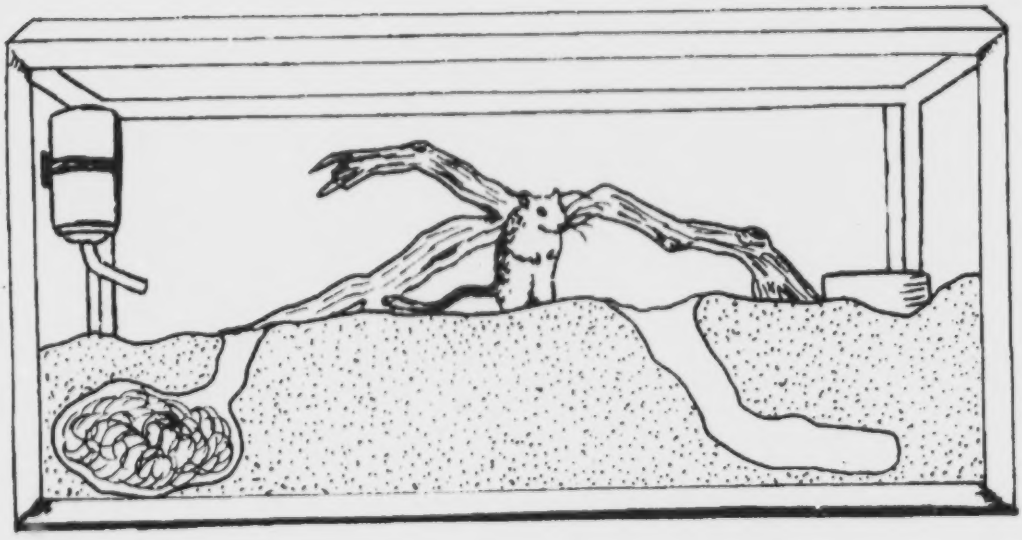


25. All of these illustrations present a particular hazard. What is it?

EXHIBITION DRAWINGS







26. Every classroom should have some living things, but which animals are suitable? What are the problems?

EXHIBITION ANSWER SHEET

The answers given are intended to address the main issues raised by the illustration and the question. Further reference to *Be Safe!* is suggested for background detail.

1. What action would you take if a child had burnt or scalded a hand?

Immediate remedial measures would include putting the hand under running cold water for at least 10 minutes. DO NOT apply any creams or lotions, use a dry dressing to cover the burn and send to hospital or doctor as necessary. What mechanism does the school have to ensure adequate supervision of the rest of the class whilst this individual is dealt with? If a classroom does not have running water, a large bowl or ice cream container full of cold water may suffice. Who has a first-aid certificate in the school? Probably a Welfare Assistant, who would then advise the Head to send the child to hospital.

2. Would you allow children to use a hot glue gun? What about other glues?

Some employers (ie LEAs in England & Wales, Regional and Islands Council in Scotland, Education & Library Boards in Northern Ireland, and governing bodies of independent or grant maintained schools) may not allow a child to use hot glue guns (or indeed any hand-held electrical appliances). If used it must be done under direct supervision. There are some 'low melt' guns available which are safer, but which still require supervision. Some glue guns are poorly designed, and constructed in a way which is electrically unsafe.

Some glues such as Evostick and similar products should only be used in well ventilated areas. Be aware of the risk of solvent abuse. Instant glues such as 'superglue' are best avoided and not handled by children.

3. How can you fly a hot air balloon safely? (What heat sources are suitable? Where should you fly it?)

Some hot air balloons use a small spirit burner to fuel the balloon. DO NOT USE such burners (see Answer to Question 5). It is safer to use a hair dryer. Do not use a paint stripper type hot air gun, which is much too hot for safe use in schools. When using hair driers, be aware of the dangers of using mains powered equipment and trailing extension leads etc. Has the hair dryer been tested for electrical safety? Using a small candle is a possible alternative but there is a possible fire risk using naked flames; this is best avoided. Some hot air balloons use a pad of cotton wool soaked in meths - again this is not recommended and must not be used. Work with hot air balloons needs careful supervision because there may be some risk of the material melting, as well as the usual dangers of suffocation with plastic bags and equivalent.

Do not fly the balloon near overhead power lines, nor anywhere if it might cause a traffic danger.

4. Which container would you use for holding hot water?

Wide based plastic jugs are best. Glass, unless pyrex or similar, may shatter. Water from a hot tap is often good enough. If a kettle is used, it should be under direct supervision. Some plastic containers (even cups used for hot drinks) may soften and collapse if boiling water is poured into them. Pour carefully so the vessel does not get knocked over as in Question 1!

5. Which heat sources are the safest to use and which should not be used at all?

Small candles or night lights in a metal tray (e.g. a baking tray) containing dry sand are the safest. DO NOT use picnic stoves or spirit burners. In the 1980s alcohol (meths) fires were probably the biggest cause of serious injuries in secondary schools. Such burners are often included in toy chemistry sets or the burner for a model steam engine. The flame is almost invisible and accidents happen when someone inadvertently pours more alcohol (meths) into the burner igniting it prematurely.

6. What sort of soldering iron should you use? Should children use them at all?

Some people do not consider there is any necessity to carry out soldering in primary schools at all. However, if you do, be aware of the following points. The Electricity at Work Regulations result in the need for all electrical appliances that are plugged in to be tested regularly. In addition, with soldering irons, there is some risk that the hot bit might burn through the mains cable if used carelessly. The low power (12 or 24 Volt) type is generally more suitable for use in schools if soldering is to be attempted. This would necessitate the use of a suitable 12 or 24 Volt power pack, although this might well be built into the stand.

The fumes from some types of soldering flux can cause additional hazards such as sensitisation. Small children are likely to be particularly close to any such fumes, and the use of flux is best avoided. Asthmatics may be particularly at risk.

7. What would you do if a child cut him/herself badly?

The immediate first aid is to apply direct pressure to the site of the wound using a pad dressing if available and elevation of the injured limb. Do not attempt to disinfect the wound or remove a pad dressing once it has been applied otherwise you will disturb the clot that is forming. If glass or other foreign objects are embedded in the wound, do not try and remove them. As before, what is the policy on dealing with serious accidents in the school? Who has a first aid certificate on the staff?

8. What issues are there when cutting up tin cans to make models?

Sharp edges can cause deep cuts so any cut metal edges should be smoothed down or taped by the teacher.

9. Which mirror should you use?

Use plastic mirrors if at all possible. Mirror tiles may be useful - although they will break, they are less dangerous than glass. Any glass mirrors should be taped round the edges. If one of the glass mirrors is dropped, how would you dispose of the glass? Should children be involved in clearing up broken glass?

10. Testing thin wires What are the safety issues raised in this picture?

In any experiment involving heavy weights great care must be taken over choice of fixing point, and what happens to the weights when the bag breaks. If a cardboard box or bucket containing crumpled up newspaper or bean bags is placed under the hanging load, toes are automatically kept out of the way of the load. In the case illustrated the thin wire from the ceiling could itself break and cause injury as it whips. This can occur when thin wires are tested to the limit: nylon fishing lines are especially hazardous, and eye protection would normally be necessary.

11. Litter collections are popular, both in and out of school. Would you allow your children to take part?

Use common sense about where you permit the collection. A plastic bag over the hand acts as a cheap glove, but anything sharp will cut it. Washing hands after such an activity is also essential. In some cases, rather than collecting, it may be more appropriate to observe and count.

12. Testing shopping bags. What issues are raised by the picture?

Similar to 10 in some ways. A bucket of crumpled paper will cushion the weights as they fall, avoiding damage to the lino floor covering, as well as to toes!

13. Electricity is dangerous isn't it? But which of these are safe to use?

You cannot get a shock from ordinary batteries, but it is not a good idea to mix different batteries. Some employers (LEAs, etc) do not allow rechargeable batteries: if short-circuited, batteries, battery holders, and thin connecting wires can get very hot and give a nasty burn. Pupils should only be allowed to use re-chargeable batteries under close supervision. Re-chargeable batteries, especially, need careful storage to prevent short-circuiting. Using power packs can be a cheaper way of running low voltage equipment, but with wires going to a wall socket it is then difficult to explain the idea of a complete circuit (although re-chargeable power packs may get round this difficulty, if your employer allows you to use them). Power packs should only be purchased from reputable educational suppliers - not all models may be suitable for school use by young children.

The British Battery Manufacturers' Association (7 Buckingham Gate, London SW1E 6JS) produce a small poster Battery Safety Guidelines, which can be photocopied freely.

14. When and how should children be taught about electrical safety?

Children should learn about the dangers associated with the use of mains electricity and appropriate safety measures. Thus when using simple circuits, an opportunity exists to deal with the folly of playing with a 13 amp socket in the home! In schools only a "competent" person under the Electricity at Work Regulations should re-wire a plug. On one of the trials of this Pack, a teacher reported that she had a box of electrical junk, which was available for children to explore on appropriate occasions. One pupil told his friends that he "knew" how to wire up a plug, and proceeded to do so, the wire not being connected to anything at the other end. He was just about to plug it in, when his teacher realised what was going on..... It may be advisable, therefore, to avoid letting the children handle electrical equipment which resembles that which they might have at home. Understanding Electricity (The Electricity Association, 30 Millbank, London SW1P 4RD) produce some good electrical safety videos, targeted at different age ranges.

15. A parent brings in an old electric fire for additional heat in the classroom. What should you do?

Under the Electricity at Work Regulations, all electrical equipment used in schools must undergo regular checking, which most education employers carry out annually. Do not bring electrical equipment from home, as it will not have been checked. Would this fire pass the safety checks? It is important to realise that electrical equipment for the domestic market may not be suitable for use in schools. Equipment intended for use in schools often undergoes special testing, involving such test instruments as opened-out paperclips. Under the Work Equipment Regulations, items sold for use at work must be suitable for the purpose for which they are to be used. Of course, an old electric fire, no longer required at home, may well not comply with modern domestic electrical standards anyway.

16. On a school day out its fun in the Sun. But is it?

There is some concern over the amount of strong sunshine to which young children should be exposed. However, the real danger on the field trip is looking at the sun through a telescope or focusing the sun's rays into the eye using a mirror type microscope. Nor should they look at the sun through sunglasses or old photographic negatives - these do NOT filter out the rays sufficiently to prevent damage. Careless discarding of glass etc. can cause fires! There are other problems of out of school activities that could be raised here.

17. This advert recently appeared in the national press. The blue powder is copper sulphate. Should you use it in a primary school?

In England, Wales and Northern Ireland, the National Curriculum Programmes of Study place an obligation on teachers to teach aspects of safety. Sometimes this may involve using hazardous materials under carefully controlled conditions. Even without such an obligation, we think it may be appropriate to use copper sulphate (and similar substances) with children, providing the hazards are carefully explained. It is important to train them for the world outside school.

It is important, however, to guard against theft. In one recent incident a child took some copper sulphate crystals, and gave them to others. They then played a game of who could suck their "blue sweetie" the longest. Storage needs to be secure but common sense.

Under the COSHH Regulations (Control of Substances Hazardous to Health) a Risk Assessment must be carried out before any hazardous chemicals are used. A list of chemicals likely to be used in primary schools is found in *Be Safe!*, and a longer list is produced by the CLEAPSS School Science Service. Most education employers have adopted these lists as providing suitable General Risk Assessments. Teachers should NOT use hazardous chemicals from outside these lists without getting approval from their employers (a Special Risk Assessment). However, even where a chemical is permitted by their employer's General Risk Assessments, teachers should still consider whether even these chemicals can be safely used in the circumstances of their classroom (size of class, degree of supervision, responsibility of the children, etc).

18. Surely food is safe isn't it, even if it is a bit mouldy?

Work with foods makes an important contribution to both science and technology. Attention needs to be paid to hygiene requirements (see overleaf). Work with moulds and yeast is suitable in primary schools. Under the COSHH Regulations (Control of Substances Hazardous to Health) a Risk Assessment must be carried out before work with microbiological materials, including moulds and yeasts. Most education employers have adopted *Be Safe!* as the basis of their General Risk Assessments for such work. Most Scottish EAs have adopted codes of practice for microbiological work, parts of which cover level 1 work in primary schools. Some people are allergic to mould spores, and so they should be grown in closed containers. Yeasts should not be completely sealed. In this case a cotton wool plug is suitable.

A sealed plastic bag can be quite a good container in other cases.

The outer coat of red kidney beans is poisonous until cooked.

19. Would you use a polystyrene hot wire cutter?

Hot wire cutters can safely be used as long as there is good ventilation, and they are operated at the correct voltage. Children at Key Stage 1 should not use expanded polystyrene because it squashes easily, and may then be poked into nose, ears etc. thus blocking them

20. Which sort of thermometer would you use?

Avoid mercury in glass thermometers (silver coloured liquid) because they slowly release small amounts of poisonous vapour if broken. If one is broken, there is no immediate danger, but contact your neighbouring secondary school for advice. Many primary schools will not have access to the chemicals needed as described in the following extract from Safety in the School Laboratory (9th edition, ASE):

> *"Mercury can be recovered mechanically with a teat pipette. Small drops may be collected by treating the affected area with a paste of copper powder and dilute sulphuric acid or with a slurry of calcium hydroxide and flowers of sulphur in hot water, the resulting mixture being swept up after 24 hours. A dry mixture of calcium hydroxide and flowers of sulphur should be swept into any cracks in benches or floor to reduce the rate of evaporation of very small quantities of hidden trapped mercury".*

Be warned that alcohol thermometers (red, blue or green coloured liquid) will break if plunged into boiling water.

21. Cooking often arises in science activities; what hygiene requirements should you observe?

Cover tables with a clean plastic sheet, wipe down with Milton (but not a general bleach) Key points would include:

- an area should be set aside for food to minimise the contamination.
- teach children the need for personal hygiene through food preparation and tasting investigations
- use cookery aprons, utensils and washing up equipment for cookery only
- do not use cookery ovens for other purposes
- site cookers and microwaves carefully, following manufacturers' instructions
- be aware some people are sensitive to food additives
- dispose of food carefully

As parents often work with small groups of children on cooking activities, they need to be given guidance.

You may need to address the issues of selling food at a school fair!

22. Ourselves is a common topic in primary schools. What problems might arise with the example given? (The pupil on the right is taking his pulse).

Do not allow children to get too competitive. Children excused from taking part in normal PE activities should not take part in investigations which examine the effect of exercise on breathing, pulse rate, etc. Although not a safety point, it is best to avoid genetics activities (eg eye colour of children, parents, and grandparents) which may reveal that a child does not live with his/her biological parents.

23. A popular book suggests the taking of a small blood sample and observing the resultant slide under a microscope. Is this a good idea?

Teachers may remember such activities from their secondary school days. However, because of the risk of AIDS and viral hepatitis, blood sampling should not now be attempted in schools. The DfE also considers that taking cheek cell samples should not be attempted for the same reason, but others (e.g. The Institute of Biology) believe it can be done safely, provided certain strict procedures are adhered to. You must follow whatever local rules your employer adopts.

24. Has your school got a pond or access to one? Is it safe?

Do not allow unrestricted access to ponds. Teach children to wash their hands after work in all environmental areas. Be aware of the possible presence of Weil's disease in water polluted by rats. Any cuts or abrasions should be covered by waterproof dressings. Canoe clubs will be able to tell you of the likelihood of Weil's disease in local streams and rivers.

25. All of these illustrations present a particular hazard. What is it?

An allergic reaction is possible in each of the cases given. For example, allergies to washing powder are well known. The danger of anaphylactic shock (ie the rapid physical reaction) in the case of a bee sting in a sensitised individual is less well known.

26. Every classroom should have some living things, but which animals are suitable? What are the problems?

Some animals are much more suitable than others for classroom conditions. There are legal restrictions on taking animals from the wild (although small amounts of frog spawn can be taken if the tadpoles are subsequently returned to a suitable environment, preferably that from which the spawn was collected). Detailed lists will be found in *Be Safe!* If keeping animals, you need to consider what will happen to them at weekends and in holidays. Some may be stressed by returning to a noisy classroom after a period at home. The RSPCA (in Scotland, the SSPCA) produces several books of guidance on keeping mammals and other animals in classrooms, and many employers have adopted these as setting suitable standards. Sometimes, visitors bring a collection of animals into school for an afternoon's lesson. Such visiting animal schemes need to be investigated very carefully: again the RSPCA issues a booklet of guidance.

ACTIVITY 2

WHY SAFETY?

35

If Activity 1 is used as a starter, then Activity 2 can be used to pull things together, and give a focus to the INSET session as a whole.

Alternatively, Activity 2 can be used as an introduction to the whole session, before proceeding into Activity 1.

Allow about 15 - 20 minutes.

What you will need: a flip chart, or a blank OHT - or a chalkboard

Procedure: a brainstorm on safety

Start by asking the audience why safety is important, why they are present at this session. Write their answers on the flip chart, etc

Typical responses include:

- uncertainty about science
- legal responsibilities
- people are asking questions
- half-remembered stories/myths about thermometers
- worries about use of some equipment - glue guns, craft knives, glass jars

Ask whether they know of any accidents (or near accidents) involving science activities in primary schools

Some examples include:

- pupil burnt when plastic cup from coffee vending machine softened and fell over, when hot water was being poured into it
- pupils coming out into a rash (on neck and chin) after handling hyacinth bulbs
- pupil burnt by glue from hot glue gun
- pupil sorting through a box of electrical junk who "knew how to wire up a plug", proceeded to do so, and was about to plug it in (with nothing on the other end) when the teacher noticed ...

Encourage further responses.

Some groups may suggest it is important to teach children about safety. This is developed further in Activity 5.

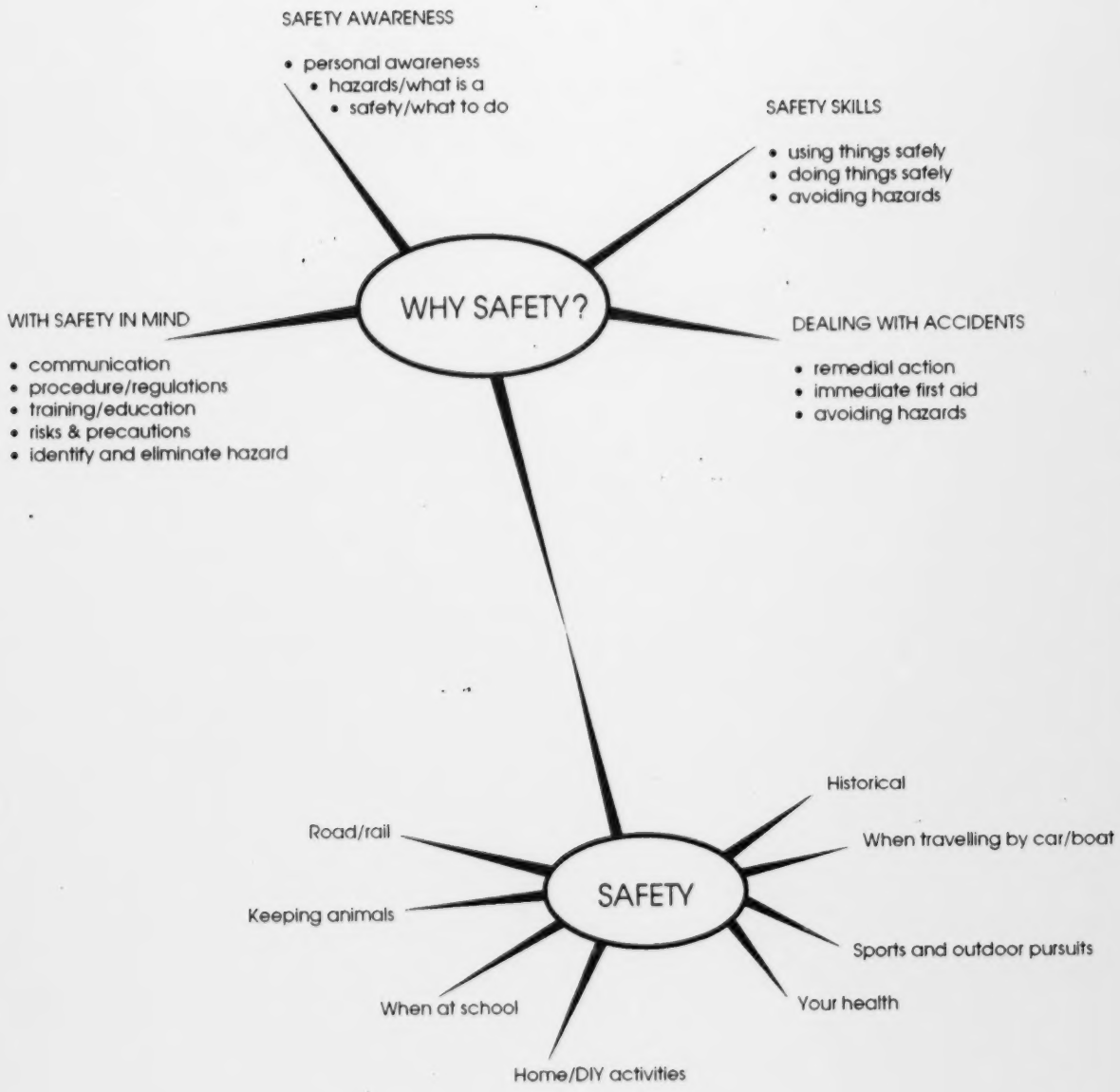
In some situations, you may decide to go straight into Activity 5 from Activity 2. Otherwise, do not prolong Activity 2, but go on to Activity 3.

An alternative approach: if time is short you could show the following sheet *(Brainstorm on Safety)* as an OHT.

or
use the sheet as the basis for prompts during your own brainstorming session, especially if you wish to build it up into something bigger.

WHY SAFETY?

BRAINSTORM ON SAFETY



BEST COPY AVAILABLE

ACTIVITY 3

SAFETY QUIZ

HOW TO USE THE QUIZ MATERIALS

You will need: for each group of about 3 teachers

- a set of the question cards (cut up and put into an envelope)
- a copy of the True/False sheets
- Answer sheets

If the Quiz Cards are to be used again, it may be best to print them onto card, and to laminate them. Ensure all copies of the cards are returned after use

Procedure: Issue a set of Cards and Sheets to each group.

Ask them to decide whether each statement is True or False, and put onto the correct Sheet.

Note that some of the questions are **deliberately ambiguous** to promote discussion. Participants will want to say "It is true some of the time ...". This is the whole point of having vague questions, so that they can explore the issues. The aim is NOT to see who gets the most right, but to develop awareness.

Allow about 10 minutes for this part of the Activity.

(It may be helpful for subsequent discussion if under each of the True/False/Not Sure headings, they arrange the cards in alphabetical order)

Then give out the Answer Sheet. Allow the group time to read the answers, and identify which ones they got right/wrong, and why.

Many of the answers refer to the important concept of **Risk Assessment.** When participants have had time to read the answer to Quiz Card A, you may wish to call the whole group together to ensure that everybody understands what it means. Then allow them to look at the remaining answers.

(Note that in giving answers we have specifically quoted relevant legislation. Most teachers will not need to know this, but it may be helpful in order to get an understanding of the legal framework governing health and safety.)

After participants have had time to read all the answers, call the whole group together, and ask them to say which ones they were surprised about, or which ones they still don't understand. Allow time for discussion in the whole group.

The whole Activity will take about 30 - 40 minutes (or longer if you have a lively group!)

TRUE	FALSE	NOT SURE

Copymaster 1/ 3

A. **Safety is the teacher's responsibility, not the employer's**

B. **You don't need to use eye protection in primary schools**

C. **Sometimes it is useful to have a hair dryer. You could bring one in from home**

D. **Children may use glue guns, under adult supervision**

E. **Teachers can be prosecuted if an accident happens in the classroom**

F. **Model steam engines must be subject to regular inspections**

G. **Schools are always short of money, so they should welcome second-hand items from parents and local industry**

H. **You should encourage children to bring in to school birds nests and other articles from the environment**

I: **A cut finger is a good opportunity to look at blood under the microscope**

J. **You must not use spirit burners for heating things**

K **It's a good idea to use toys as a starting point for work on forces and energy**

L. **A good Science 1 investigation would be to get children to mix kitchen chemicals**

M. You should not borrow chemicals from your neighbouring secondary school for growing crystals

N. Even when investigating moulds growing on bread and other foods, it should be kept in a closed plastic bag or other container

O. Microbes grow well on jelly (agar gel). You can get some good investigations by collecting samples from toilet seats, or getting children to cough over the jelly

P. It is a good idea to use glass objects in the classroom so that children can be taught to use it safely

Q. Growing plants is a perfectly safe activity

R. You can assume that children know how to use scissors and knives safely

S. The Factories Inspector could initiate action resulting in the imprisonment of the Chief Education Officer

T. You must not collect frog spawn

U. You can saw wood and plastic in any classroom

V. Anyone can give "first-aid"

W. Spirit pens are always the best ones to use

X. Rechargeable batteries are banned

SAFETY QUIZ ANSWERS

A. Safety is the teacher's responsibility, not the employer's

False, but ... Under the Health and Safety at Work Act, employers are responsible for the health and safety at work of their employees (ie, you, the teacher) and of others who might be affected by their actions or omissions (ie, the pupils and parents). A variety of Regulations have been introduced under this Act. These include the COSHH Regulations (Control of Substances Hazardous to Health), under which a Risk Assessment must be carried out before hazardous chemicals are used or made, or micro-organisms (such as moulds) are used. Under the Management of Health and Safety at Work Regulations a Risk Assessment must be carried out before any hazardous activity is attempted. A Risk Assessment involves identifying the hazard, and seeking ways to eliminate or reduce the risk arising from it. Some Risk Assessment is little more than common sense, but particularly where some specialist knowledge may be required (as with electrical safety, or hazardous chemicals) it is your employer's responsibility to give guidance, by producing General Risk Assessments. However, you should still consider their applicability in your situation. For work in primary science most employers have adopted *Be Safe!* as the basis for their General Risk Assessments, sometimes with local modifications. Whilst *Be Safe!* cannot cover every situation which might arise in primary science, it does cover the most likely ones, either explicitly, or in general terms. Sometimes, however, a Special Risk Assessment may be necessary. Your employer should have procedures for this, for example (for members) by consulting the CLEAPSS School Science Service, or, in Scotland, SSERC. *Be Safe!* was checked by the Health and Safety Executive, and endorsed by the DfE and the Welsh Office. A teacher who follows the guidance in *Be Safe!* will have little to fear.

B. You don't need to use eye protection in primary schools

False, but ... Under the COSHH Regulations (Control of Substances Hazardous to Health) a Risk Assessment must be carried out before hazardous chemicals are used or made. A Risk Assessment may well include the requirement to adopt certain safety precautions such as protective goggles. Primary schools could avoid using such chemicals, but in fact some are in quite common use, for example copper sulphate for crystal growing. You would need to use eye protection if the Risk Assessment required it. If your employer has adopted *Be Safe!* as the basis for your General Risk Assessments, then you would need to check that publication. Because of the difficulty of getting goggles or safety spectacles that fit small faces, and the need to replace them frequently because of scratching, it is probably best to avoid activities that would require eye protection. Any goggles that you use MUST comply with the British Standard (BS2092) and would be so marked. Avoid the use of "toy goggles" found in some chemistry sets.

BEST COPY AVAILABLE

C. Sometimes it is useful to have a hair dryer. You could bring one in from home

True, but ... All portable mains operated electrical equipment used in schools must (under the Electricity at Work Regulations) be subject to a regular testing (usually annual). Items brought in from home will not normally have been included. Under the Provision and Use of Work Equipment Regulations 1992 all equipment for use at work must be suitable for purpose. Items supplied for the domestic market may not necessarily be suitable for use at work - or in school, in this case. For example, they may not be sufficiently robust, or live wires may be too accessible to unbent paper clips. Also, you would not run a domestic hair dryer continuously for 30 minutes, and it might overheat if you attempted to do so in school. Thus, all equipment for use in school should come from reputable educational suppliers.

D. Children may use glue guns, under adult supervision

True, but ... In principle, the answer is yes, children can use glue guns, although some employers have banned them, especially by younger pupils. One problem is the risk of burns, although low melt glues may avoid this, but are not as easy to use. A number of commonly used glue guns, even of apparently reputable make, have been found to be electrically unsafe in that they are unreliably earthed. Items intended for the domestic market, or indeed industrial use, are not necessarily appropriate for use in schools, see C. At least one primary school child has been burnt when they held a glue gun up, so that molten glue dripped down their leg.

E. Teachers can be prosecuted if an accident happens in the classroom

True, but ... In secondary schools, only two prosecutions of science teachers have taken place since the Health and Safety at Work Act came into force in 1975. On one occasion the teacher had flagrantly disregarded LEA guidelines, and failed to use the safety equipment provided. In the other, the teacher was attempting to make gunpowder as an end of term treat. No primary teachers have been prosecuted. The message, therefore, is that teachers must consult their employer's General Risk Assessments (usually this will be *Be Safe!*, possibly supplemented by Local Rules), and take care to follow them carefully. Then, in the unlikely event of things going wrong, it would be the employer which is in trouble, not the teacher.

F. Model steam engines must be subject to regular inspections

True Under the Pressure Systems and Transportable Gas Containers Regulations 1989, steam engines (and pressure cookers) must be inspected regularly; annually is probably sufficient. The main point is to check that the safety valves are free running - if necessary, seek guidance from a local secondary school, or, if a member, from the CLEAPSS School Science Service, or, in Scotland, from SSERC. Note that methylated spirits is very dangerous and MUST NOT be used as a fuel - many serious accidents have occurred in secondary schools due to its use.

G. Schools are always short of money, so they should welcome second-hand items from parents and local industry

False Under the Provision and Use of Work Equipment Regulations 1992 articles supplied for use at work must be suitable for purpose for which they are to be used. Those bought for use at home or in industry may well not be suitable for use in schools (see answers to C and D). If in doubt, seek further guidance from your employer, or, if a member, from CLEAPSS, SSERC or ASE.

H. You should encourage children to bring in to school birds nests and other articles from the environment

False A risk assessment would show there is some risk of infection from birds nests, and especially from dead or injured animals. If your employer has adopted *Be Safe!* as the basis for its General Risk Assessments, you must follow that advice, i.e. dead and injured animals should be removed as soon as possible, and birds nests should be contained in plastic bags or similar. Bones should be sterilised, and feathers at least washed.

I. A cut finger is a good opportunity to look at blood under the microscope

False In England and Wales, the DfE has issued strong recommendations against any working with blood (or indeed cheek cells), because of the risk of transmission of AIDS and viral hepatitis. Most education employers have made it a local rule - you MUST follow any such rule.

J. You must not use spirit burners for heating things

True Almost certainly your employer will have a General Risk Assessment which states that spirit burners must not be used. If not, it is recommended that you follow the guidance in *Be Safe!* Much safer alternatives are candles or night lights standing in a metal tray (eg a baking tray) of sand, or for many purposes hot water from a tap is adequate.

K. It's a good idea to use toys as a starting point for work on forces and energy

True, but ... Items intended for the domestic market may not necessarily be suitable for use at school (Provision and Use of Work Equipment Regulations 1992). Beware of cheap imports, which might have lead paint. Watch out for sharp edges, insecure attachments, etc.

L. A good Science 1 investigation would be to get children to mix kitchen chemicals

False Before any practical activity a risk assessment must be carried out. It is unlikely that your employer will have produced any guidance on mixing chemicals, ie there will be no General Risk Assessment available for you to consult. Random mixing of chemicals could be highly dangerous. Vinegar and bicarbonate of soda can be mixed safely (but not in a closed container). On the other hand, vinegar and bleach produce a highly toxic gas. If you do not know what will happen, it is not safe to do it. Even if you do know, your employer's General Risk Assessment may not permit it. Most employers will have adopted *Be Safe!* - see Section 7 of that publication. Be warned that some published materials contain very dangerous suggestions.

M. You should not borrow chemicals from your neighbouring secondary school for growing crystals

False, but ... Some chemicals can be safely used, but note, for example, that copper sulphate is harmful (and indeed caused the death of one child at home). Consult your employer's General Risk Assessments, probably *Be Safe!* Section 7.

N. Even when investigating moulds growing on bread and other foods, it should be kept in a closed plastic bag or other container

True Some people are allergic to the spores. Your employer's Risk Assessments (e.g. *Be Safe!* Section 11) will probably require this precaution.

O. Microbes grow well on jelly (agar gel). You can get some good investigations by collecting samples from toilet seats, or getting children to cough over the jelly

False You certainly can do some good investigations - BUT you must not. Your employer's Risk Assessments should warn you against most work involving culturing from the environment, especially where there is a risk of pathogenic organisms. Consult your employer's General Risk Assessments.

P. It is a good idea to use glass objects in the classroom so that children can be taught to use it safely

True, but ... As in all potentially hazardous practical activities, a risk assessment must be carried out, and in all probability your employer will have a General Risk Assessment. Some employers ban the use of glass in infant classrooms. With older children, some use of glass is unavoidable, but where plastic alternatives exist it is sensible to use them. When glass gets broken, use the opportunity to show children how to clear it up safely. Older pupils might do it themselves under close supervision, but teachers must check that it has been done thoroughly. You must follow local rules. Plastic containers are usually a good alternative, but note that polystyrene (e.g. some types of disposable cup) will deform with hot water and may tip over as a result.

Q. Growing plants is a perfectly safe activity

True, but ... However some plants or parts of them, eg seeds, are poisonous. Seeds bought from garden centres etc. may have been treated with pesticide, and should not be used: those from health food shops should be safer. Red kidney beans (uncooked) and castor oil seeds are especially poisonous. General Risk Assessments from most employers will have limited their use in schools. Has yours?

R. You can assume that children know how to use scissors and knives safely

False Sometimes junior teachers assume it has been learnt in the early years; and similarly teachers of younger children assume it has been taught at home. Pupils need to be taught or reminded how to use all tools safely, and given guidance on the dangers of waving them around, or misusing them. Sharp pencils can be dangerous, too!

S. The Factories Inspector could initiate action resulting in the imprisonment of the Chief Education Officer

True, but ... It hasn't happened yet. In the case of independent or grant maintained schools the Headteacher and/or Chair of Governors would be similarly at risk. A Factory Inspector of the Health and Safety Executive can ban the use (and has!) of equipment that is unsafe, or that the school has not checked that it is safe to use.

T. You must not collect frog spawn

False, but ... There are legal restrictions on taking plants and animals from the wild. Note that animals includes not only mammals, but also birds, mini beasts and other creatures. For details see AM 3/90 Animals and Plants in Schools Legal Aspects (DfE, 1990). You are allowed to take frog spawn, but you should take only small amounts for study, and return the young adults to the pond from which it was taken. This also requires keeping them in good conditions so that the animals survive to adulthood. Many education employers will have their own guidelines concerning which animals may be kept in schools, and expect schools to follow CLEAPSS and RSPCA guidelines (or, in Scotland, those of SSERC and SSPCA) in publications such as Animals in Schools, Small Mammals in Schools, and Visiting Animal Schemes.

U. You can saw wood and plastic in any classroom

True, but ... You must be aware of the risk from dusts which can persist for some time. Adequate ventilation is usually all that is required.

V. Anyone can give "first-aid"

False The term "first-aider" applies to someone who has undergone an approved training course and has passed an examination. It is usually valid for three years. Such trained staff have some legal protection if they administer first aid, but that protection does not apply to untrained staff. For example, moving a casualty can give rise to further serious injuries in some circumstances. Giving a pain killer such as paracetamol is strictly "treatment" which only a doctor is able to do. However, in an emergency, where seconds count, non-first aiders might be expected to take Immediate Remedial Measures. A suitable list is given in Appendix 3.

W. Spirit pens are always the best ones to use

False These are usually permanent markers that have a solvent in them which may be addictive. While access to solvents and glue is restricted by law, such pens are readily available, and have caused problems in a few schools.

X. Rechargeable batteries are banned

False nationally, could be true locally. There is no national ban. Some education employers have banned their use because when short-circuited they can get very hot, which might burn children. This is because they have relatively low internal resistance. If your employer does permit their use, make sure that they are stored in such a way that they can not short-circuit accidentally when in store, for example by preventing them from rolling around loose in drawers and trays, or by preventing battery holders with external connections from touching.

ACTIVITY 4

MAKING IT RELEVANT FOR

YOUR SCHOOL

DEVELOPING A POLICY FOR SAFETY IN SCIENCE

You will need: a blank OHT, or flip chart, or chalkboard

Procedure: a brainstorm session

Assuming this Activity is taking place after Activities 1 to 3, by now participants should have a fair idea of the likely issues.

Unless specifically required by your employer (which is unusual in primary schools), there is no requirement to have a safety policy for science. Nevertheless, suggest that it might be useful for your school (any school) to have a safety policy for science (& technology?). The starting point for a safety policy for primary science is to look at what already exists as the health & safety document for the school and see if there are any gaps with regard to primary science. What policy is already in place?

Invite ideas about what might go into it, knowing the context of your particular school.

Writing the Policy: After the brainstorm, a procedure needs to be agreed for getting the policy written. Probably the science co-ordinator will be expected to draft something, and then take it back to a staff meeting for final agreement.

Prompts: If necessary, throw the following suggestions into the debate, or use them at the end, as a checklist.

- Science in primary schools is a very safe activity.
- When children are engaged in a variety of open-ended investigations, there is always the possibility that something could go wrong, and teachers need to remain vigilant.
- Staff should be aware that not everything printed in books is safe to do!
- Suggest adopting *Be Safe! Some aspects of safety in primary school science and technology for key stages 1 & 2* (2nd edition, 1990, ASE) as the essential publication on matters of safety in primary science.
- At least one copy of relevant publications to be kept accessible to staff and that all staff should be familiar with their contents.
- Induction procedure to ensure all new staff are familiar with your policy and practice
- A note about *COSHH Regulations* (see Answer A in the Quiz in Activity 3) to ensure that no chemicals (including household chemicals) should be used until a General Risk Assessment has been consulted (see Section 7 of *Be Safe!*).
- Schemes of work could highlight any problem areas where staff need to be extra vigilant.
- Who should be contacted in an emergency? Is this the science adviser (if any), or CLEAPSS if the school is a member, or, in Scotland, SSERC?
- A note about mains powered equipment is essential as no such equipment should be brought into school unless it is safe and appropriate for use by children of the particular age concerned. Has such equipment been subject to a regular test?
- What is the policy about bringing animals into school? Where are RSPCA (or, in Scotland, SSPCA) publications kept?
- How are safety articles in *Primary Science Review or Education in Science* or CLEAPSS (or, in Scotland, SSERC) publications communicated to all staff?
- Are staff aware of the services of CLEAPSS (if the LEA/school is a member), or, in Scotland SSERC, particularly for Special Risk Assessments?
- A list of activities that require CAUTION or those that are NOT SUITABLE or those that require CLOSE SUPERVISION to remind colleagues of areas of concern that are easy to overlook in a busy school day!
- Do you want to copy any of the Appendices from this Pack, eg for each classroom, or as a part of your policy?

A SCIENCE SAFETY CHECKLIST

So you've got a safety policy for science. How does your practice match up against the following checklist?

- When was your present policy for safety in science last reviewed? .....
- Has your policy been adopted by the Governors (or, in Scotland, the School Board, if there is one)? .....
- Has your employer (if not the Governing Body) been informed of your policy? .....
- Is the policy and/or *Be Safe!* readily accessible to staff? .....
- Is there a procedure for drawing the attention of new staff to the policy? .....
- Is there any way of checking that staff are actually following the policy? .....
- Who on the staff is responsible for safety in science? .....
- Are safety warnings built in to appropriate parts of your Scheme of Work? .....

An example of a school's Safety Policy is given in Appendix 4, although it does not cover all the points in the checklist.

ACTIVITY 5

TEACHING CHILDREN ABOUT SAFETY

A SAFE EDUCATION IS NOT THE SAME AS A SAFETY EDUCATION

Starting points: Children are very safe in school. Statistics show that schools are the safest place a child can be. They are much safer in school than at home, or than when travelling between home and school.

But that does not necessarily mean we are teaching them about safety.

A safe education is not the same as safety education, any more than a healthy education is the same as health education.

You will need: OHT blank, flip chart or chalkboard

Procedure: Science is an excellent vehicle for teaching safety - electricity, microbes, chemicals, road safety ....

Ask participants to discuss in groups of 2 or 3 about the contribution that science can make to teaching pupils about safety and highlight opportunities in the curriculum where safety can be stressed as an important part of a topic.

Then collect together their ideas on the OHT, etc

To think about: Should these be built into your Scheme of Work for science?

ACTIVITIES FOR CHILDREN

Is your classroom safe?

This could be a useful exercise in raising the awareness of children (and teachers) about the dangers in a classroom. At the start of a new term or new school year, it may be worthwhile raising the issue of safety with your own class.

Keeping Safe

If you have the FIRST LOOK scheme by Gilbert & Mathews (published by Oliver & Boyd/ Longmans) the card "KEEPING SAFE" might be a good prompt. It covers:

- What are the dangers?
- What puts a fire out?
- How can you be seen more easily in bad light?
- How can you send danger-warning signs?
- Looking further

What precautions are taken at home to stop younger brothers or sisters hurting themselves?

Could children make a game from the sheet of Common Safety Symbols (Appendix 9)? Perhaps it might be an electric game, where if they correctly match the symbol to the hazard, a light comes on.

Teaching Safety through Science

The ASE is hoping to produce a pack of ideas which might be used for teaching safety to children. It might look like some of the SATIS 8-13 materials.

We would welcome suggestions of what might be included, ideas that you have tried and which worked well. Perhaps even copies of children's work that might be included as exemplars.

Please write to: **John Lawrence,**
Deputy General Secretary,
ASE HQ,
College Lane,
Hatfield,
Herts. AL10 9AA
Tel: 0707 267411 Fax: 0707 266532

Appendix 1

Letters from Secretaries of State endorsing *Be Safe!*

Y SWYDDFA GYMREIG
GWYDYR HOUSE
WHITEHALL LONDON SW1A 2ER
Tel. 071-270 3000 (Switchwrdd)
071-270 (Llinell Union)
Fax: 071-270 0568

Oddi wrth y Gweinidog Gwladol

SIR WYN ROBERTS MP

WELSH OFFICE
GWYDYR HOUSE
WHITEHALL LONDON SW1A 2ER
Tel 071-270 3000 (Switchboard)
071-270 (Direct Line)
Fax: 071-270 0568

From The Minister of State

CT/3471/90

September 1990

Dear Director,

ASSOCIATION OF SCIENCE EDUCATION: REVISED "BE SAFE" BOOKLET

This letter is sent to you with a complimentary copy of the ASE's newly-published revised "Be Safe" booklet, which sets out in a very clear way all the main aspects of safety advice and guidance needed for the teaching of the National Curriculum Key Stages 1 and 2 in primary schools.

I very much welcome this initiative by the Association in producing the booklet. It has been prepared in consultation with the Welsh Office, the Department of Education and Science, specialist HMI advisers and the Health and Safety Executive, and should prove of real value as a detailed code of safety for school science and technology, to the benefit of both teachers and pupils in minimising the risks and hazards likely to be encountered.

I hope that you and your colleagues will regard this as a useful publication for the primary schools for which you are responsible.

Yours sincerely,

Wyn Roberts

Director of Education

DEPARTMENT OF EDUCATION AND SCIENCE
ELIZABETH HOUSE YORK ROAD LONDON SE1 7PH
TELEPHONE 01-934 9000
FROM THE PARLIAMENTARY UNDER SECRETARY OF STATE

September 1990

Dear Chief Education Officer

ASSOCIATION OF SCIENCE EDUCATION: REVISED "BE SAFE" BOOKLET

This letter is sent to you with a complimentary copy of the ASE's newly-published revised "Be Safe" booklet, which sets out in a very clear way all the main aspects of safety advice and guidance needed for the teaching of the National Curriculum Key Stages 1 and 2 in primary schools.

I very much welcome this initiative by the Association in producing the booklet. It has been prepared in consultation with my Department, its specialist HMI advisers and the Health and Safety Executive, and should prove of real value as a detailed code of safety for school science and technology, to the benefit of both teachers and pupils in minimising the risks and hazards likely to be encountered.

I hope that you and your colleagues will regard this as a useful publication for the primary school(s) for which you are responsible.

Michael Fallon

MICHAEL FALLON

BEST COPY AVAILABLE

Appendix 2

Safety Bibliography

In addition to the **Bibliography** published on page 26 of the 2nd edition of *Be Safe!*, the following additional references are of interest.

1. HSC *The Responsibilities of School Governors for Health and Safety* HMSO, 1992. ISBN 0 11 886337 1

2. HSC Education Service Advisory Committee *Safety policies in the education sector* ISBN 0 11 883810 5

3. HSC Education Service Advisory Committee *Reporting School Accidents* (summary sheet). Available from Education National Interest Group, Health and Safety Executive, Maritime House, 1, Linton Road, Barking, Essex IG1 8HF

4. Department of Education and Science/Welsh Office *Arrangements for first-aid provisions in schools and colleges* 1987. Available from LEAs

5. HSC *Management of Health and Safety at Work Regulations 1992 Approved Code of Practice L21*, HMSO ISBN 0 11 886330 4

6. HSC *Workplace (Health, Safety and Welfare) Regulations 1992 Approved Code of Practice and Guidance L24*, HMSO ISBN 0 11 886333 9

7. HSE *Health and Safety (Display Screen Equipment) Regulations 1992 Guidance on Regulations L26*, HMSO ISBN 0 11 886331 2

8. HSE *Manual Handling Operations Regulations 1992 Guidance on regulations L23*, HMSO ISBN 0 11 886335 5

9. HSE *Personal Protective Equipment at Work Regulations 1992 Guidance on Regulations L25*, HMSO 0 11 886334 7

10. HSE *Provision and Use of Work Equipment Regulations 1992 Guidance on Regulations L22*, HMSO ISBN 0 11 886332 0

11. Department of Education and Science. Administrative Memoranda (applicable only in England & Wales)
    AM3/76 *The use of asbestos in educational establishments*
    AM2/86 *Children at school and problems related to AIDS*
    AM3/90 *Animals and plants in schools: legal aspects*

12. Department of Education and Science (1989) *Safety in outdoor education* HMSO ISBN 0 11 270690 8

Other useful contacts include (only available to members):

The CLEAPSS School Science Service, Brunel University, Uxbridge, UB8 3PH
Tel: 0895 251496 Fax: 0895 814372

Scottish Schools Equipment Research Centre (SSERC), 24, Bernard Terrace, Edinburgh EH8 9NX
Tel: 031 668 4421 Fax: 031 667 9344

Appendix 3

Immediate Remedial Measures in the Event of an Accident

Reprinted by kind permission of the CLEAPSS School Science Service.

You should be able to take appropriate immediate remedial measures while waiting for first aid for the following accidents:

Splashes of glue, paint, chemicals etc in the eye
Immediately wash the eye under running water from a tap for at least 5 minutes. The flow should be slow and the eyelids held back. Afterwards, the casualty should go to a doctor or a hospital.

Substances in the mouth, perhaps swallowed
Only find out what has been taken and wash out the casualty's mouth. After any treatment by the first aider, the casualty must be taken to hospital.

Burns
Cool under gently running water until first aid arrives.

Hair on fire
Smother with a cloth.

Clothing on fire
Push the casualty to the ground, flames on top. Spread a thick cloth or garment on top to smother the flames.

Electric shock
Do not touch the casualty or equipment. Break contact by switching off or pulling out the plug. If necessary, push the casualty clear with a broom handle, wooden chair etc.

Bad cuts
Apply pressure on or as close to the cut as possible, using fingers or a pad of cloth. Leave any embedded large objects and press round them. Lower the casualty to the floor and raise the wound as high as possible.

Choking
If the casualty is coughing, do not interfere. If the casualty cannot cough or speak, summon help immediately. Try to remove the obstruction with your fingers. If this fails, give four sharp blows between the shoulder blades with the heel of the hand, repeating, if necessary, with the casualty bent forward, head below chest.

These immediate measures are usually the most important ones and often the only ones needed.

Appendix 4

Example of the Safety Section from one School's Science Policy

Reprinted by permission of the school concerned

Health and Safety

Science in primary schools is a very safe activity. However, when children are engaged in a variety of open-ended investigations, there is always the possibility that something could go wrong, and teachers need to be vigilant. Staff should also be aware that not everything that gets printed in books is safe to do!

This LEA's *Local Code of Practice for Safety in Science in Primary Schools (1992)* is encompassed in the booklet *Be Safe! Some Aspects of Safety in Science and Technology for Key Stages 1 and 2* (2nd edition, 1990, Association for Science Education). Copies of this booklet are kept in the Science Resource Cupboard, and also in the Staff Room. All staff are expected to be familiar with its contents, and to stick strictly to its guidance.

Areas where particular care is needed are marked in our Scheme of Work for Science.

Note in particular that under the *COSHH Regulations (Control of Substances Hazardous to Health)* no chemicals (including kitchen chemicals) should be used until a Risk Assessment has been consulted; this means checking Section 7 of *Be Safe!* Expanded polystyrene (waste packaging) should NOT be used by children in the nursery or infant departments.

No mains powered electrical equipment should be purchased, or brought into school from home, unless it is safe and appropriate for use by children of this age. All mains electrical equipment is subject to an annual safety check by the LEA.

This LEA maintains a subscription to the CLEAPSS School Science Service (Brunel University, Uxbridge, UB8 3PH, telephone 0895 251496). This organisation produces a wide range of guides about all types of equipment for primary science. The guides are free to members, and CLEAPSS also offers a consultation service by post or by telephone. They should always be consulted before electrical items are purchased, and it is wise to do so before purchase of any expensive items.

Teachers keeping animals in their classrooms should adopt the practices described in the relevant RSPCA publications (*Animals and Schools* and *Small Mammals in Schools*), copies of which are kept in the Science Resource Cupboard. The CLEAPSS School Science Service can also be consulted.

In all cases of doubt, consult the Science Co-ordinator, or the LEA Science Adviser or the CLEAPSS School Science Service.

Appendix 5

Safety and the School Pond

(Phil Bunyan, Primary Science Review, Summer 1988, 21)

Safety and the school pond

***Phil Bunyan** of the ASE's Laboratory Safeguards Subcommittee gives some valuable advice on creating and using school ponds safely*

School ponds are becoming increasingly popular, especially in primary schools. They are being seen as an important part of a wild area and can provide a variety of educational opportunities.

Although generally very safe, ponds do present some possible dangers many of which can be avoided by a little thought at the planning stage. In this article we outline some of the hazards and suggest ways of minimizing them.

How big?

Some schools have produced extremely good ponds in old bathtubs or sinks. Others have constructed what amounts to a small lake! However, for a good general purpose pond there is little point in exceeding a size of about 4 metres by 3 metres. A pond of this size could have a shallow marsh area at one end as well as a large open pond area. Alternatively, the marsh area could be separate from the pond, in which case the pond itself could be smaller still.

How deep?

Opinions differ on this but the following depths and approximate proportions produce a useful and safe pond. Any marsh area and two thirds of the pond area should be flat-bottomed and about 25 cm deep. Large stones and rocks should be avoided in this area to reduce the risk of someone hitting their head should they fall in. The remaining one third of the pond should be divided into two flat bottomed areas of 50 and 75 cm depth respectively. The 50 cm terrace should occupy about two thirds of *this* area (that is, two ninths of the pond) with the deepest terrace occupying the final one ninth of the pond.

The deep terrace is necessary for the coldest winter conditions when the bulk of the water might freeze. It is highly unlikely for the deeper water to freeze even during the harshest winter.

As far as possible the pond should be constructed so that if a person accidentally fell in they would land on the shallow terrace only. This may not necessarily mean constructing the terraces in concentric circles with the deepest in the middle. If the pond is constructed in a corner, for instance, so that access is from one side only, then the deeper terraces should be on the other side.

If you already have a pond which is larger and deeper than the dimensions suggested then you may wish to consider making it shallower. Large flat stones can be used to raise the bottom level so that anyone falling in could still have a firm base to stand on. Avoid concrete blocks because they may contain chemicals which will leach into the water and kill wildlife. A deep layer of soil is also not desirable since this will form a sludge which could trap anyone who fell in.

Construction style

Most ponds begin as a hole in the ground. There are then a number of methods of making this waterproof, the most common being concrete, flexible rubber lining, and pre formed glass fibre. All have advantages and disadvantages which are discussed in a variety of publications (see below).

The obvious hazard associated with a hole is that people can fall into it. The risk of doing this can be reduced if the edges of the pond are raised some 30 cm above ground level. This usually means a brick, stone, concrete, or wooden surround has to be made. Clearly this is better from a safety point of view since, especially for younger children, it is difficult to trip over a raised edge. In addition, a raised pool has the advantage that it is easier to move in the event of alterations to the school buildings etc.

If you are not going to construct a pond with a raised edge then careful thought needs to be given to edging materials. In 'natural' ponds grass quickly grows over the edge of the pond making it very difficult to see where the land ends and the pond begins. It is therefore a good idea to define the edge with paving slabs. These will provide a safe viewing area and dipping platform and should be laid so that their edges *only just* overlap the edge of the pond. Slabs have further advantages in that they are not slippery when wet and they can restrict trampling of vegetation by defining the area where pupils may normally stand.

Location

The pond ought to be clearly visible from the school buildings rather than tucked in an out-of the way corner. Although an obvious site makes the pond more apparent to would be vandals, it may in fact lead to less vandalism because it is open to view. It will certainly be safer since anyone is more likely to be seen in the event of an accident. Do not, however, site your pond on or near an obvious pathway official or otherwise. Through traffic with associated running and chasing, increases the risk of accidents. Occasionally school grounds are used as short cuts by the local community. A pond on or near such a route could be a significant hazard, especially after dark.

It can be a good idea to site the pond near a wall to close off access to one side. However, it should not be so near the wall that children climbing on the wall could fall directly into the pond. As stated earlier, the deeper areas could then be arranged on the wall side to reduce possible hazards. Remember too that the wall will cast a shadow which could affect plant growth in the area.

Do not site the pond under deciduous trees which will shed their leaves into it. After only a few years such a pond becomes filled with a thick sludge of decaying material which is unpleasant, potentially dangerous if pupils fall in, and will eventually turn the pond into a swamp or marsh.

BEST COPY AVAILABLE

Security

The danger of children falling into a pond is perhaps greatest during out-of school time, weekends, holidays, etc. With infants, however, the risk of a child straying into the pond area may be present during school hours too. To prevent this, the pond should be enclosed by some sort of barrier. A low wall would be suitable, as would a hedge or fence of some sort, or anything which will prevent small children accidentally wandering into the pond area and falling in, but will not restrict visibility unduly. It is not necessary to surround the pond with a high wall or fence and a securely locked gate. Enterprising youngsters will undoubtedly be able to climb over such an obstacle and once inside become less visible and more at risk. In some cases, where a pond is within a wild area, the boundary of the wild area with its rampant vegetation has proved an effective barrier despite being physically quite insubstantial.

It has been suggested that some form of metal grille which fits over the pond is a good idea. This would undoubtedly prevent children from falling in but, to be really effective, it would need to be secured down. Otherwise youngsters could lift the grille, fall in under it and become trapped. The grille does, however, need to be removable in order to study the pond itself. Grilles which conform to these requirements may exert quite an influence over plant growth and could intrude into the educational value of the pond. There is also a high risk that the metal from the grille will very quickly contaminate the water and kill sensitive species. On balance, grilles are probably not a very useful solution; effective enclosure of the pond area should make a grille unnecessary. It is important, however, for you to decide whether or not in your particular circumstances a grille is a good idea.

With regard to security, it is sensible to consult the school caretaker before going ahead and constructing a pond. It is the caretaker who will be responsible for security (and possibly maintenance) during weekends and holidays and she or he will probably have views on location etc. which need to be considered. There is also a great deal to be said for including parents in the construction. Not only are they a good source of labour, but they may feel a commitment to supervising the pond informally during evenings, weekends, and holidays. The consultation process should of course include all the teaching staff, as a pond is often a whole-school resource. Security and general supervision are easier to achieve if all staff share the responsibility.

Much of this advice is fine if you are making a pond from scratch but what if you already have one? In this case you should adapt your pond to conform to the spirit of the suggestions. If it is very deep then think about filling it. Consider access and whether it needs to be restricted in some way.

With all ponds it is necessary to consider both educational value and safety. An effective pond needs to be secure and sufficiently restricted to encourage wildlife. Properly constructed such a pond is also likely to be safe.

Further reading

The following publications include advice on pond construction.

Wildlife gardening resource pack
BTCV (British Trust for Conservation Volunteers), 36 St Mary's Street, Wallingford, Oxfordshire OX10 0EU.

Planning an outdoor studies area in the school grounds
Devon Educational TV Service, Hoe Centre, Notte Street, Plymouth PL1 2AR.

Schools nature project
Planning your school nature garden
Urban Spaces Scheme, Dept of Food and Biological Sciences, North London Polytechnic, Holloway Road, London N7 8DB.

Planning and constructing ecological study areas on school sites
Curriculum Resource Centre, University of Exeter, St Lukes, Exeter EX1 2LU.

Developing a school nature reserve
The Secretary, The National Association for Environmental Education, West Midlands College of Higher Education, Goreway, Walsall WS1 3BD.

Water wild life pack
The Environmental Resource Centre, Old Broughton School, McDonald Road, Edinburgh EH7 4NN.

Nature by Design—a teachers' guide to practical nature conservation
The Urban Wildlife Group, 11 Albert Street, Birmingham B4 7HA.

BEST COPY AVAILABLE

Appendix 6

Safety in out-of-school-science

(Ray Vincent and John Wray, School Science Review, 1988, 250, 70, 55)

Safety VIII
Safety in out-of-school science*

■ R Vincent and J Wray

The article deals with the organization of out-of-school science activities, outlines the potential problems staff may face and suggests good practice. It attempts to point up the safety considerations that need to be taken into account at each stage of the planning and running of a visit, and includes a chronological checklist

This is not another of those articles intended to tell staff how to plan a visit, but an attempt to point out the safety considerations involved in any visit, with any group of students, of any age or ability.

The article is divided into two parts, an outline of the problems involved in planning a visit and a checklist of questions that need to be answered at various stages of the planning.

The following notes are offered in the belief that well organized activities are likely to be safer. They suggest good practice in those aspects of the organization and management of science out of school, which, if ignored, can jeopardize the safety of staff and pupils. The main safety aspects considered will centre upon traditional field work and visits to industrial sites which may or may not involve residential stay.

Well planned work is safe work. In planning any trip the following need to be considered:

1 Preparation
2 Staff and leadership
3 Pupils
4 Travel
5 Residential base
6 Work site or visit
7 Activities
8 Emergencies

PREPARATIONS

Before any planning can be considered the need for a visit must be identified. This may be:

1 Part of a prescribed course eg A-level biology.
2 Some area of work being covered such as an industrial process in chemistry.
3 It may be that staff simply wish to stimulate their pupils with a visit to an area of the country different from their own.

This list is endless but in every case there must be some objective with which students, staff and parents can identify.

In preparing for safety it is necessary to consider the aims of the work, the pupil and parent involvement, any particular hazard of the area or site to be visited and to obtain the necessary permission and appropriate insurance cover.

The only way that a visit can be planned for safety is for the staff organizing the

* Previous articles in this series were published in nos 209, 215, 217, 224, 231, 236, 246.

visit to carry out a reconnaissance to identify possible risk areas. Local experts should be contacted at this planning stage and advice sought from wardens of field centres etc. It is advisable on long stay visits to find places where students can let off steam in the evenings. Permission to visit certain areas can also be sought on a personal basis rather than by letter and the hazards and equipment needed can be identified.

Parents will need to know the purpose of the trip, the proposed programme of activities and be asked to give their written permission. A meeting of the parents is often a good way to introduce the aims of longer visits, identify the area to be visited and the staff involved. It also gives a chance for parents to inform staff of any problems there may be relating to medical conditions or diet. Most local authorities or school governing bodies will have available indemnity forms to be used for the purpose, see Appendix 1. Permission must also be sought to authorize any medical treatment which is professionally recommended and the address and telephone numbers to be used in case of emergency must be obtained.

All local authorities have regulations regarding insurance for trips but it is as well to check that they cover the places to be visited. Visits to hazardous sites or mines may not be included in the standard LEA package.

STAFF AND LEADERSHIP

Decisions will have to be made about the staff pupil ratio. This will be dependent on the age of the students, whether the party is single sex or mixed, on the sites to be visited and the nature of the activities to be undertaken. A safe working minimum is one member of staff for fifteen pupils with a minimum of two staff with the party at all times. Staff in this sense could be taken to include responsible adults. The number of adults needed will rise the younger the children. The LEA will have regulations on the minimum number needed.

The leader of the party should have some experience of the activities involved in the visit. The roles and responsbilities of staff must be recognized. Subordinate members of staff should have been involved from the earliest planning stages. Incapacity of the leader should not endanger the rest of the party because of lack of knowledge. All staff must accept responsbility for informing themselves of all aspects of the work, safety and any special conditions or problems of individual children. Lack of communication between staff could spell disaster. Above all else it must be clear who is in overall charge (this may not be the senior member of staff). This fact must be clear to pupils and parents.

Pupils and staff in the group should do any preparation together. This may include written work or getting fit if outdoor activities are involved. They will need special training if activities involving work in areas such as fells or mountains are contemplated.

There is no substitute for experience with activities such as climbing or walking in exposed country. Reference 1 gives details of courses aimed at gaining this experience.

Staff and pupil preparation is also useful in producing a sense of purpose within the group. School journeys may well have children from different forms in them. It also gives the students a chance to get to know the staff and vice versa. Most of all it can be used to give pupils an idea of the discipline standards expected from them. These may well be much stricter than in the classroom if potentially dangerous activities are involved. It also gives staff a chance to identify any who cannot behave or obey orders before the trip starts. Staff must be aware of the medical conditions of pupils and must consider the activities to be undertaken in the light of these.

PUPILS

Pupils will need to be briefed about each part of the programme. This will need to include awareness of potential hazards, the expected standard of behaviour (firms

in the past have refused school visits because students from the schools concerned on previous visits had misbehaved so badly) and reference to any safety equipment to be used. Experience suggest that students feel silly in hard hats and white coats so there is a need to explain why they are to be worn. A check needs to be made to ensure pupils are wearing clothing and footwear suitable for the terrain, activity and season. Shoes are often a problem. They need to be robust, waterproof and adequately soled. Students will need to take adequate food and drink and must be made aware that they must not eat unfamiliar plants or drink from streams.

If the party is to be left to its own devices, eg to use work sheets in museums or study small areas of countryside, the pupils should be divided into groups of a minimum of three with one reliable pupil in charge. That pupil should be familiar with the use of any emergency equipment provided and take responsbility for maps etc. At least one member of the group must have a reliable watch. All members of the group should understand details of assembly points, recall signals and telephone numbers if out of doors, and times of assembly.

TRANSPORT AND TRAVEL

If travel is to be undertaken in self-drive vehicles, such as the school minibus, several questions need to be answered. Is the driver suitably qualified, authorized and experienced for the vehicle concerned? LEAS and school governors should have regulations about this. Is there more than one driver in the party? Is the vehicle being operated in a correct manner? Is it kept in good order and serviced on a regular basis? The driver must organize the trip to ensure rest periods during the journey. It is worth noting that vehicles with capacity over nine passengers will need a tachograph fitted if travelling in EEC countries. It is a wise precaution to leave logbooks at the residential base.

For any type of journey a note of proposed route, estimated time of arrival and stated points on the journey both outward and return together with a full list of the party and leader, should be left at school or the base.

If travel is to be by public transport students will need to know exactly what to do if they get split from the main group. It must be assumed this may happen and experience suggests for younger pupils the group is best split into smaller units of about six with a responsible adult. For older students they need to be fully briefed on the route to be taken. If the journey involves walking account needs to be taken of the age and physical ability of the students. Adequate stops need to be made to allow for rest, refreshment and toilet calls. Recall signals need to be known and staff assigned to prevent pupils from going ahead or dropping behind the main body of the group.

In coach travel, staff should sit at points throughout the coach! There is a need to check that coach firms have noted the bookings, and that insurance cover is adequate. Do not assume coach operators are as efficient as they pretend! For local trips the temptation to dismiss the students without returning to school should be resisted except in the case of older pupils, or unless written permission has been obtained from parents or guardian.

THE RESIDENTIAL BASE

If the visit entails an overnight stay the base must be checked for safety. Fire escape routes need to be clearly identified. Staff must know how to use fire alarms. Rules laid down by the house must be understood. All staff must have a list of the whole party. Responsibility of staff must be clearly defined. Staff will also need to be able to contact the base if changes of plan occur while on trips.

SITE

The particular hazards of the site will need to be identified and the appropriate precautions taken. These hazards may include:

Physical
Slippery surface especially at the edge of ponds, streams, rivers and on rocks on the foreshore; subsidence; falling rocks; steep slopes; cliffs; harbour edges; beaches with rip currents, tidal flows and large infrequent waves; streams and rivers.

Biological
Infected animal corpses; infected water; soil contaminated with animal waste, pesticide sprays and residues.

Others
Machines in factories; the need to cross roads or railway lines; slippery surfaces under foot in chemical works or power stations; hazardous materials used in the factory.

If certain activities are to be carried out, such as pond dipping, access to the water will need to be in a safe place or some sort of platform used.

ACTIVITIES

Most activities will need some sort of equipment. This must be safe to carry and use. It should be lightweight and not easily breakable. Sharp objects such as pencils carried in pockets can be a hazard in a fall. Glass should be avoided and lenses only issued to responsible people.

Special equipment may be necessary. Gloves for handing certain animals, in particular mammals and some plants. Eye protection will be needed if rocks are to be chipped. Strong sensible shoes or boots if mines, quarries or factories are to be visited. NOTE Companies have a duty to provide hard hats if these are needed but it is as well to check they know the numbers needed.

If specialist equipment is needed training in its use is vital and the safety precautions associated understood.
All wounds can involve the risk of tetanus.
It is a wise precaution to plan alternative activities to allow for changes in the weather.

Most of the above details can be dealt with at a daily briefing or a previsit discussion. Pupils on long stay visits need to be able to relax. This will need staff supervision in the same way as any other activities.

EMERGENCIES

There must be a clear procedure for dealing with emergencies. All leaders need to have with them the telephone numbers of the base and/or the school plus on a residential trip the local doctor and emergency and rescue services.

First aid and simple emergency kit should be carried with staff trained to use it especially when walking in open country. The kit could include: map, compass, whistle, torch with spare batteries and a watch. With older children emergency rations may also be a good idea. (It is felt that younger children should not be put in the situation where the use of such rations could ever be considered necessary.) There may be a need to carry suitable survival equipment (eg survival bag) in case of serious emergency. This may be caused by change in the weather just as much as by a broken limb. Any child in lightweight clothing will quickly succumb to exposure if wet.

At all times staff must reserve the right to refuse to take a child on any sort of visit if they feel that child is a danger to themselves or the rest of their party. The key to a good visit is planning and discipline.

CHECKLIST

It may be an idea to photocopy this and tick the items off as they are completed.

1 Identify the aims of the trip and whether the proposed activities are likely to achieve them.
2 Carry out preliminary visit to area, site or museum etc.
3 Identify the potential hazards associated with the area.
4 Contact local experts or site manager to identify need for protective clothing or safety gear.

5 Obtain permission to visit factories, mines etc or contact schools advisory service for museum visits. Book guides and/or rooms if available.
6 On an industrial visit check that the gear available will fit the students!
7 Find somewhere for students to relax.
8 Notify parents and seek their permission. Issue indemnity forms and obtain addresses and telephone numbers just in case, (see Appendix 1).
9 Train staff and pupils in any new skills that may be needed. NOTE This may include first aid.
10 Plan pre-trip work.
11 Organize travel arrangements.
12 Obtain insurance.
13 Decide on number of adults needed. Invite staff to join team.
14 Brief staff on responsibilities.
15 Check travel arrangements.
16 Is a minibus to be used? Check credentials of drivers and insurance position.
17 Check with places to be visited that bookings are correct.
18 Check emergency phone numbers.
19 Finalize list of members of the party.
20 Issue instructions re: food and drink and prohibition of eating things found.
21 Issue written instructions re: equipment clothing and behaviour.
22 Brief staff on problems associated with students in their groups.
23 Organize groups for independent work choose leader and brief group on procedure and time of recall.
24 Check clothing and footware.
25 Divide the group into small units for travel on public transport.
26 Check emergency gear, MAPS, COMPASS, TORCH, WATCHES, FIRST AID KIT.
27 Give details of travel to base.

BIBLIOGRAPHY

Useful ideas on safety can be found in the following.

1 Nichols, D (ed), *Safety in Biological Fieldwork* - Guidance Notes for Codes of Practice, (Institute of Biology, 1983).

2 SCDC, *Out and About* - A Teachers Guide to Safe practice out of school (2nd Edn), Methuen, 1987.

3 The *Report on the Lands End tragedy* produced by the Bucks Education Authority has many things to say about safe visits.

The ASE publication *Be Safe - Some Aspects of Safety in Science and Technology for Primary schools*, published 1988 has excellent lists and pictures of plants which need to be treated with caution.

REFERENCE

1 *Mountain Walking Leader Training Scheme* (summer). Produced and organized by the Mountain Walking Leader Training Leader Training Board. This has details of leadership schemes and can be obtained from MLTB Crawford House, Precinct Centre, Booth Street East, Manchester M13 9RZ (061-273-5839).

The article was written by RVincent, Head of Science at Ilford County High School, based on some ideas by J Wray(ILEA) and the rest of the ASE Laboratory Safeguards Committee.

Appendix 7

Safety article

(from ASE Primary Science Teachers Handbook by Kevin Hunn, pages 171-3)

Safety

The ASE publication *Be Safe! is* an extremely useful safety guide. Besides being an essential read in itself it contains a comprehensive bibliography.

Teachers and children need an awareness of dangers, risks and how to prevent avoidable injury. It is part of every teacher's role to draw attention to the risks without scare-mongering. Ideas in printed materials cannot all be assumed to be safe. Decisions also need to made concerning the children within the group - are they responsible, aware or capable of doing silly things? The numbers of children or weather conditions could make a seemingly safe activity much more risky. Risks are greatly reduced when children have developed an awareness of dangers combined with a responsible attitude towards themselves and the immediate, local and global environment.

Accidents can happen, so a First Aid kit should be easily accessible to deal with damage, burns, eyes, avoiding infection, swallowing. Teachers should be familiar with the schools accident policy and procedures which in turn should reflect the LEA and National guidance.

Some of the risk areas are highlighted below in the form of questions teachers can help their children to internalise, so that whatever they are doing safety becomes one of their natural considerations.

1. Am I aware of what keeps me healthy? - hygiene, diet, rest, exercise, safe actions.

2. Can these materials or this situation damage my body?
   - on a large scale - fall onto me from a height (secure fixing, keep heavy loads low down), drown me (ponds, rivers etc.), suffocate me, could I fall off/out/onto, be run over, slip. Am I aware that materials may be more dangerous the bigger they are, the faster they go, the harder they are?
   - burn me? heat, chemical, electrical, sun in the eyes, cooking, scalding
   - cut me? Do I know how to use tools safely? Work with more resistant materials requires larger forces to change them and as a result there is more risk. Glass objects should be used carefully and if broken, do I know what to do?
   - stick to my body? Glue guns should be used under close supervision and super glues not used at all.
   - enter my eyes? Do I avoid objects flicking or splashing into my eyes? Do I avoid touching my eyes when working with materials (particularly plant materials). Do I avoid strong light particularly from the sun and magnifiers. Do I wear goggles when there are risks?

- enter my ears? Do I know the dangers of loud sounds or objects being put in my ear?
- enter my nose? Do I know the risks and dangers of smelling certain solids, liquids (particularly solvents) and gases (fumes from burning, exhaust, gas etc.? If a material is used in smell tests do I avoid small particles entering my nose (e.g. using muslin)
- enter my mouth? Do I know which materials can be safely tasted and when I can do so? Am I aware of the dangers of eating/tasting certain materials (medicines, plants/animal/waste material, infected material, alcohol and other drugs, living things) Do I suck my thumb when working with materials?
- infect me? - Am I aware of the need to cover materials, to reduce germs by washing hands/keeping hands covered, keeping hair tied back and the basic need for hygiene? Are shared materials disinfected? (e.g. with Milton)
- aggravate my complaint? Am I able to take part in fitness investigations? Do I know which materials and circumstances to avoid? (e.g. for asthma, allergy, eczema, epilepsy, pace-maker, etc.)
- cause emotional stress? beg work on differences, genetics etc.

3. Do I know the risks and how to avoid them?
   - HIV, household materials, visits, BSE, pollutants, germs, Weil's disease, tetanus, fertilisers and pesticides, hepatitis, etc.

4. Do I know the conventional warning signs on packaging? (See *Be Safe!* pp. 15, 21).

Appendix 8

Index to *Be Safe!* (2nd edition)

(it is suggested that this page should be copied and pasted into the back of the school's copies of Be Safe!)

A

Aeroplanes	- safety when flying	8
Allergic reactions	- to animals	19
	- to plants	9, 23
Animal organs	- sources, sensitive use of and disposal	17
Animals	- safety code for keeping and using	19
	- suitable for keeping	18
	- which should not be kept	19

B

Ballistas	- safety in use	8
Balloons	- hot air, safety in use	8
Batteries,	- dry - use	16
	- rechargeable - use	16
Birds nests	- safety in presentation	24
Blood	- avoiding prolonged contact with	10
	- human samples not to be taken	17
Boiling rings	- use as source of heat	11, 12
Boomerangs	- safety in use	8
Bottled gas burners		11

C

Candles	- use of	11, 12
Catapults	- safety in use	8
Chemicals	- choice of suitable	4
	- dangerous and unsuitable	15
	- disposal of dangerous and unwanted	15
	- safety in use and in storage	15
Chisels		6
Conservation	- areas	24, 25
	- protecting the environment	18, 19, 25
Constructions	- large, strength and stability	7
Cookers	- types suitable, location and use	9
Cooking activities		9, 12
Corrosive chemicals	- care in use	14
Craft knives		6

D

Disinfectants	- considered dangerous	15
	- suitable	9, 17, 21
Disposal	- animal remains	17
	- chemicals	15
	- foods	9
	- micro-organisms	21
Dusts	- hazardous; need for	15
	- ventilation when produced	6

E

Edges, dealing with	- metal	6
	- mirrors	10
Electric power supply, low voltage		16
Electrical apparatus	- choice of and safe use	16
Electricity	- safety code	16
Environmental areas	- safety code	24
Eye protection	- use of safety glasses and goggles	7, 12, 25

F

Feathers	- safety in presentation	24
Field work	- safety code	25
Fire safety	- equipment	11
"First aid"	- see Immediate Remedial Measures	
Flames		12, 13
Flammable liquids	- care in use and storage	14, 15
Food	- hazards of	9
	- storage	9
	- tests for types	9, 17
Foods	- safety and hygiene	9, 17
Fossils	- collecting	25
"Frisbees"	- safety in use	8
Frog spawn	- collection of	18

G

Garden areas	- safety when working in	24
Gas, portable bottled gas burners		
	- unsuitable for use	11
Glass	- dealing with broken	10
	- substituting by plastics apparatus	10
Glassware	- choice and safety in use	10
Gliders	- safety when flying	8
Glues	- choice of	6
	- hot glue guns	6
	- solvents	6

H

Hair driers	- use as source of heat	11
Hammers	- care when using	6
Heat	- sources recommended	11
	- sources not recommended	11
Heating	- liquids in test tubes	13
	- over open flames	13
	- safety code	12
Heavy objects		7
Hot glue guns		6
Hot water	- use as source of heat	11
Hygiene	- after environmental work	24
	- after handling chemicals	15
	- after handling living things	19, 21
	- when preparing foods	9

I

Immediate remedial measures		
	- burns	19
	- cuts	10, 12
Industrial visits	- organisation and safety	25
Indicators	- of acidity and alkalinity	14
Infection	- possible from animals	19, 25
	- risk during fieldwork	24
Irritants	- animals	19
	- chemicals	14
	- plants	9, 23

K

Kilns	- adult use only	11
Kites	- safety when flying	8
Knives	- craft, safe use	6

L

Labelling	- micro-organism cultures - dating	21
Labelling - chemicals	- need for	15
Lenses	- possible fire risk when used to focus the rays of the sun	25
Low voltage power supplies		16

M

Mangonels	- safety in use	8
Medicines	- local regulations on keeping and giving	17
Micro-organisms	- suitable material	20
	- risks when using	20
	- safety code for using	21
	- safe disposal	21
Microbes		20
Microscopes	- caution when using natural light to illuminate	25
'Minibeasts' (small invertebrate animals)		
	- suitable for keeping	18
	- collecting	24
Mirrors	- choice of and safety in use	10
Moulds		20, 21

N

National Curriculum and Safety		5
Nightlights		11
Nylon fishing line		7

O

Ourselves	- safety code for investigations	17

P

Paint strippers, hot air	- not recommended for use	11
Parachutes	- launching	8
Pendulum	- hazards	7
Peppers, chilli	- skin reactions to juice	9
Pesticides	- dangerous chemicals	6, 15
	- on seeds	22, 23
	- on crops	25
Picnic stoves	- not recommended	11
Plants	- suitable for keeping	22
	- poisonous	23
	- safety code for using	23
	- safety code for using environmental areas	24
Polystyrene	- cutting	6
	- dust from	6
Ponds	- safety when using	24, 25
Power supply, low voltage		
	- choice and use	16
Powered tools	- selection and use	6
Protective clothing	- for some fieldwork	24, 25
	- when handling chemicals	13, 15
	- when cooking	9
	- when disposing of micro-organisms etc.	21
Pulleys	- secure fixing	7

R

Rockets	- chemically powered rockets and motors	8
	- using water	8
Rocks	- taking samples by chipping	25

S

Safety glasses and goggles		
	- use	7, 12, 25
Safety rule(r)	- need for use when cutting using knife	6
Saws	- choice of	6
Seeds	- poisonous	23
	- suitable for germination and growth	22
Sensitivity	- to foods	9
Sinks	- need for hygiene	9
Soldering irons	- choice of	6
Solvent	- misuse	6
Sound	- safety when investigating	17
Spinning discs (eg 'Frisbees')		
	- safety	8
Spirit burners	- not recommended	11, 15
Stress	- emotional and physical	17
Stretched rubber bands and fine plastic line		
	- safety risks from	7
Sun	- care needed when observing	25

T

Tasting foods	- safety	9
Tasting plants	- avoid unless safety is assured	23
Testing	- with heavy objects and large constructions	7
Thermometers	- choice and use	9, 12, 17
Tools	- care and choice	6

W

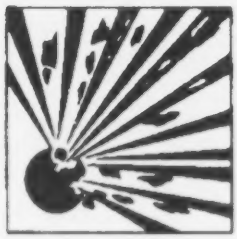
Warning symbols, International		
	- examples	15, 16, 21
Water rockets		8
Weil's disease		25

Y

Yeast	- use of and disposal	20, 21

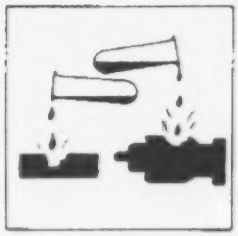
Appendix 9

Common Safety Symbols



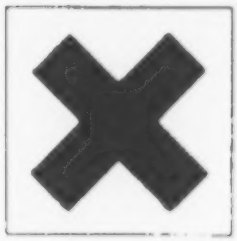
EXPLOSIVE

OXIDISING



CORROSIVE

HIGHLY FLAMMABLE



HARMFUL or IRRITANT

TOXIC

CORROSIVE

HIGHLY FLAMMABLE

RADIOACTIVE

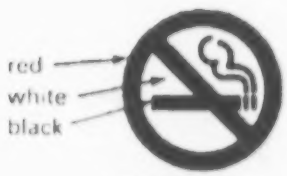
RISK OF ELECTRIC SHOCK (DANGEROUS VOLTAGE)

BIOHAZARD

DANGER

LASER RADIATION

NON-IONISING RADIATION



NO SMOKING

EYE PROTECTION MUST BE WORN

Teachers helping teachers teach science

ASE can help all Primary teachers teach Science.

ASE has about 22,000 members with a substantial primary membership. Organised into 19 locally based regions covering the whole of the UK, each region runs its own programme of activities – meetings, visits, exhibitions – designed to meet the needs of local members.

ASE is fully independent and receives no financial support from the government.

The Association for Science Education,
College Lane, Hatfield,
Herts, AL10 9AA
Tel: 0707 267411
Fax: 0707 266532

Primary subscribers receive

Primary Science Review: published five times a year

Education in Science: published five times a year

ASE Primary Science: a broadsheet published three times a year

10% Discount on Books - on both commercial and invaluable ASE publications

Local and Regional Meetings with opportunities to share ideas and for professional development

The Annual Meeting – undoubtedly the best INSET event of its kind is held over four days in early January. Attended by over 5,000 people

ASE INSET: The Association validates in-service training courses in primary science at both Certificate and Diploma level

HELP & ADVICE on urgent and important matters is only a telephone call away

LIAISON with other organisations such as national curriculum and assessment councils

Co-operation with other subject associations has resulted in the highly acclaimed *The National Curriculum – Making it Work* series.

ASE BESTSELLERS FOR PRIMARY SCHOOLS

Primary Science: A Shared Experience designed to help teachers to share the science they do in the classroom with parents and other adults associated with the school. The loose-leaf format enables teachers to add their own material. The pack gives ideas for involving parents:

- directly in school science activities
- in exploring the science in everyday life, eg within the home
- in museum visits, in science clubs, school-industry links and project work.

Audience: Primary Science teachers, Children at Key Stages 1 & 2, Parents

School Home Investigations in Primary Science (SHIPS)
Three books (SHIPS 1, 2 and 3) each containing 18 home investigations designed to be given out in class, done at home with the family and discussed back in the classroom. All materials are fully photocopiable.
Each investigation:

- fits in with school work - general or science topics
- contains notes for teachers which explain the concepts in a simple way and offer suggestions for follow-up work
- is graded for difficulty as 'infant', 'lower junior' or 'top juniors'.

Audience: Primary Science teachers, Children at Key Stages 1 & 2, Parents

SATIS 8-14 (Science and Technology in Society) Boxes 1 and 2 Unique resources for Science and Technology at Key Stages 2 and 3:

- varied cross-curricular, active learning materials
- 10 photocopiable books
- endorsed by industrial and academic scientists and technologists
- linked to television and radio broadcasts
- ideal for supporting primary/secondary transition work
- reference to National Curriculum, and the Curriculum recommendations of Scotland and Northern Ireland.

Audience: Teachers, Children at Key Stage 2

Primary Science Review - a collection
Published in 1992, a collection of key articles from past issues of the primary journal of the Association.
Audience: Teachers

Prices on application.

QUESTIONS AND ANSWERS • *Q & A* • QUESTIONS AND ANSWERS • *Q & A* • QUESTIONS AND

Here are just a few of the ways we have helped some of our Primary School Members – can we help you?

Q. I am in the process of writing a Science Policy for my school and I am finding it difficult to find up to date material to help me.
A. We sent a copy of the ASE Policy Statement for Primary Science and details of other relevant publications.

Q. We are anticipating starting a pond and wildlife area in the school grounds. We are, therefore, seeking advice and information concerning this study area. I would be very grateful for any information you have.
A. We sent copies of articles from Primary Science Review which dealt with the establishment of nature reserves in school grounds – including aspects of safety.

Q. Could you please forward to me any information, list of events etc that you think may be useful to me as a newly qualified primary teacher whose specialism is science.
A. We sent the programme of events for the relevant ASE Region, and details of the ASE Annual Meeting and Area Meetings which would offer valuable sources of quality INSET.

Q. We are planning our Science programme for Key Stage 2. Can you offer us any guidance?
A. We sent Schemes of Work for Key Stage 2 to reflect Science in the National Curriculum.

Q. Can you help us set up assessment, recording and reporting procedures to reflect our philosophy for Science and support the needs of the National Curriculum?
A. We sent several ASE publications: Teacher Assessment – making it work for the Primary School, National Curriculum Science – a guide to implementation at Key Stages 1 and 2: Planning and Record Keeping as well as ASE responses to recent DfE consultations on reporting.

BEST COPY AVAILABLE

Primary Membership Application

Please use block capitals

Surname _____ Mr Mrs Miss Ms or Title _____

First Name(s) _____ Date of Birth _____

Home address _____ School address _____

_____ _____

_____ _____

_____ Post code _____ _____ Post code _____

_____ _____

Education authority (if appropriate) _____

Present post _____ Subject specialism _____

Subscription rates for the academic year 1994/5

Primary Teacher	£24.00 ___
Primary School	£38.00 ___
Student membership	£10.00 ___

Remember: The cost of membership can be added to your allowances against income tax.

Have you previously been a member of ASE? YES ☐ NO ☐

If YES please give date and category of previous membership _____

_____

I enclose a cheque for £ _____

payable to ASE for my membership from 1st October 19__

Please debit my Access/Visa Account No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

with amount £ _____ Signed _____ Expiry Date _____

Name and Address as on card _____

_____

_____

Send to Membership Department ASE, College Lane, Hatfield, Herts AL10 9AA Tel (0707) 267411 FAX (0707) 266532

• Your first subscription must be paid by cheque, Access/Visa. Making future payments by Direct Debit will save you £1 per annum, please complete the form attached if you wish to do this and return to the A.S.E. Please note that this does not apply to student members.

DIRECT DEBIT

INSTRUCTIONS TO YOUR BANK/BUILDING SOCIETY TO PAY DIRECT DEBITS

A.S.E.
Identification 994727
Number

Please complete parts 1 to 4 to instruct your branch to make payments directly from your account. Then return the form to:-

Membership No. .....

The Association for Science Education, College Lane, Hatfield, Herts, AL10 9AA.

To: The Manager,

.....Bank / Building Society.

.....

.....

.....

Bank Sort Code No. _ _ _ _ _ _

Date of first payment on or within one calendar month from 1st OCTOBER 19.....

1. Please write the full postal address of your branch in the box above.

2. Name of account holder .....

3. Account Number .....
Banks/Building Societies may refuse to accept to pay Direct Debits from some types of account.

4. Your instructions to the bank/building society and signature
- * I instruct you to pay Direct Debits from my account at the request of the Association for Science Education
- * I understand that ASE may change the amounts and dates only after giving me prior notice.
- * I will inform the bank/building society in writing if I wish to cancel this Instruction
- * I understand that if any Direct Debit is paid which breaks the terms of this instruction, the bank/building society will make a refund.

Signature(s) .....

Date .....

N.B. Not applicable to Student Members

Other useful contacts include (only available to members):

The CLEAPSS School Science Service, Brunel University, Uxbridge, UB8 3PH
Tel: 0895 251496 Fax: 0895 814372

Scottish Schools Equipment Research Centre (SSERC), 24, Bernard Terrace, Edinburgh EH8 9NX
Tel: 031 668 4421 Fax: 031 667 9344

The Association for Science Education

Your opportunity to influence the decision-makers in science education

ASE is the organisation for teachers and others contributing to science education at all levels. If you teach science, if you are an adviser, technician or student or even work in industry, you can benefit from membership.

The benefits of membership include:

- ✓ Free journals - ***Education in Science*** which is sent to all members five times a year, ***Primary Science Review*** for primary members and ***School Science Review*** for Secondary members.
- ✓ Book sales service with 10% discount on ***all*** purchases - whether for school or personal use.
- ✓ Special insurance rates and ***free*** indemnity insurance for individual UK members. Covers you for those school trips.
- ✓ An advice service to help you with problems in the classroom, for example on aspects of safety.
- ✓ The opportunity to attend the ASE Annual Meeting - the largest event of its kind in the United Kingdom.

- is a forum for the views of the membership. Its regional structure enables these views to be heard by government, education authorities and industry.
- is completely independent. It receives no funding from government, is financed from members' contributions and is a registered charity.
- is totally committed to the advancement of science education
- membership is open to all involved or interested in science education.
- subscriptions are deductible for tax purposes.

For further details, including subscription rates, please write to:-
The Membership Manager, ASE, College Lane, Hatfield, Herts, AL10 9AA.

Tel: 0707 - 267411
or
Fax: 0707 - 266532